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Military, Political and Economic Data

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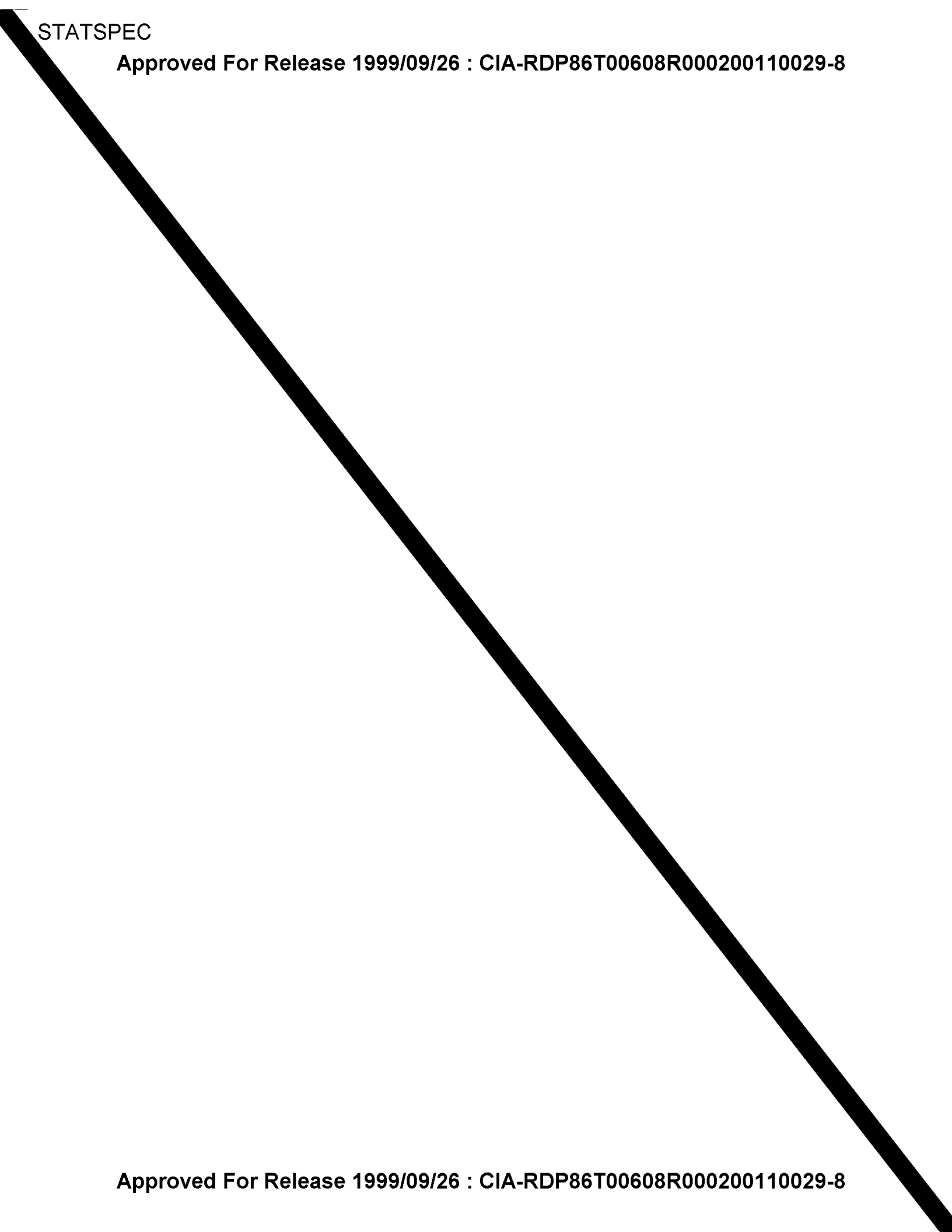

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PEOPLE'S REPUBLIC OF CHINA

MILITARY, POLITICAL AND ECONOMIC DATA

FORWARD

This reports consists of the full translation of the trial edition of a Chinese People's Liberation Army training manual entitled TRAINING INSTRUCTIONS FOR 40-MILLIMETER ROCKET LAUNCHERS AND 60-MILLIMETER MORTARS. This training manual was published in Peking, July 1972, by the Military Training Department of the General Staff Department of the Chinese People's Liberation Army.

CONTENTS

QUOTATIONS FROM CHAIRMAN MAO

Comrades throughout the party should place emphasis on war, study military affairs and prepare to fight.

As for the training courses, the main objective should still be to raise the level of technique in marksmanship, bayoneting, grenade-throwing and the like and the secondary objective should be to raise the level of tactics, while special emphasis should be laid on night operations.

As for the method of training, we should unfold the mass training movement in which officers teach soldiers, soldiers teach officers and the soldiers teach each other.

The 1969 and 1956 Models of the 40-mm Rocket Launcher

Dealing with enemy tanks will be a very important problem in countering future wars of aggression. The 40-mm rocket launchers are the primary weapons used by infantry units to knock out enemy tanks and armored vehicles. For this reason, we must improve the training given to infantry units in the firing of 40-mm rocket launchers.

We must start with the requirements of actual combat and truly strive to perfect our study and training by strictly observing the needs of training, by fully implementing the principle of linking theory with reality, by proceeding from the simple to the complex, and by placing the emphasis on the important points. We must conscientiously summarize our experiences, continue to improve the quality of our training, and strive to master the skills connected with firing accurately and rapidly under all sorts of conditions.

40 mm Rocket Launchers

BASIC FACTS ABOUT THE WEAPONS

Chairman MAO has instructed us: "When you do anything, unless you understand its actual circumstances, its nature and its relations to other things, you will not know the laws governing it, or know how to do it, or be able to do it well." The key to learning the basic facts about a weapon lies in gaining an understanding of its qualities and capabilities in combat and a familiarity with the names and functions of its principal parts, and this in turn will afford an excellent foundation for using and caring for the weapon.

I. Combat Qualities and Capabilities

The 40-mm rocket launchers are the primary weapons used by infantry units to knock out enemy tanks and armored vehicles and to destroy his fortified installations.

The Model 69 rocket launcher has a sighting range of 500 meters, and it can hit enemy tanks and armored vehicles on a direct line of fire at distances of up to 300 meters. It can penetrate armored plating up to 260-mm in thickness.

The Model 56 rocket launcher has a sighting range of 150 meters, and it can hit enemy tanks and armored vehicles on a direct line of fire at distances of up to 100 meters. It can penetrate armored plating up to 180-mm in thickness. It can penetrate concrete installations from 60 to 80-cm thick and earthen walls from 120 to 180-cm thick.

When fired, a backblast of gas exits out the rear of these weapons, and there is no recoil.

II. Names of Parts, Their Uses; Disassembly and Assembly

A. Names and Uses of Major Parts

Model 69 Rocket Launcher

The rocket launcher is composed of the barrel, the striker mechanism, the firing mechanism, the optical sights, the open sights, and the bipod. It is also supplied with a set of accessories and spare parts.

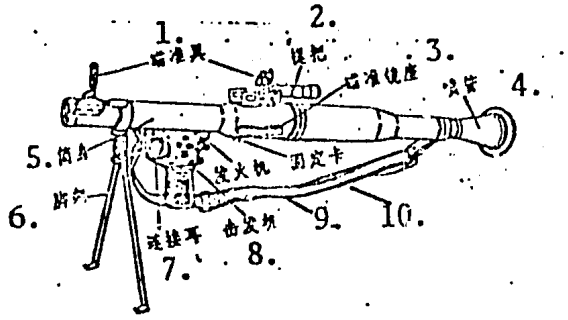


Diagram 1. Rocket Launcher

Key:
1. Open sights
2. Handle
3. Sight mounting bracket
4. Breech guard
5. Barrel, tube
6. Bipod
7. Connecting lug
8. Firing mechanism
9. Striker mechanism
10. Clamp

1. Barrel - determines the direction taken by the rocket and of the backblast of gas that exits out the rear of the tube.

On the barrel are found the following: positioning slots which accommodate the positioning stud [ejection pin] on the rocket and which align the forward detector [ch'ien chien-ch'a-ch'i] [?front bore sight plug] in its position; a connecting lug by which the firing mechanism is affixed to the tube; a striker mechanism base to which the striker mechanism is attached; and a breech guard which serves to minimize the recoil.

2. Firing Mechanism - is composed of the trigger, the percussion lock, the hammer, the safety, and a push rod with a spring. The mechanism is used to fire the rocket and to provide a safety device.

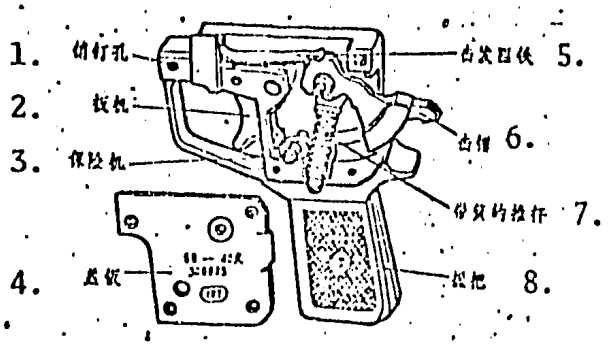


Diagram 2. Firing Mechanism

Key:
1. Pin hole
2. Trigger
3. Safety
4. Cover plate
5. Percussion lock
6. Hammer
7. Push rod with spring
8. Pistol grip

3. Striker Mechanism - is composed of the firing pin, the striker spring, and an adaptor nut. It strikes the percussion cap to detonate the rocket.

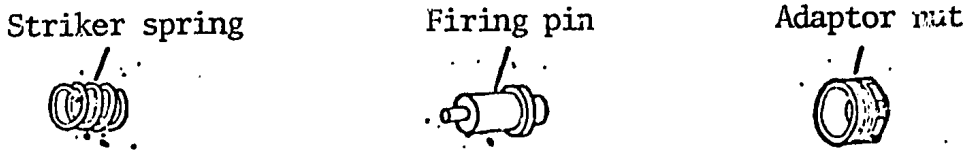


Diagram 3. Striker Mechanism

4. Optical Sights and Open Sights

a. Optical Sights - are composed of a temperature adjusting knob, an azimuth adjusting screw, a graduated scale plate, a socket, and an illumination device. It is used for aiming and to determine the range and speed of a target.

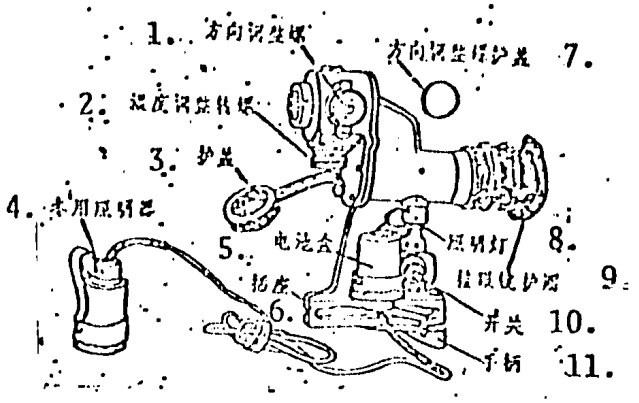


Diagram 4. Optical Sights

Key:
1. Azimuth adjusting screw
2. Temperature adjusting knob
3. Lens cover
4. Illumination device for use in winter
5. Battery box
6. Mounting socket
7. Cover for azimuth adjusting screw
8. Illumination light
9. Eye shield
10. Switch
11. Hand grip

Temperature adjusting knob: this knob has markings for +50, +35, +20, 0, -20, and -40 degrees [centigrade], and is used when firing under different temperature conditions.

Reticle: is composed of cross hairs, a grid, a range scale, and a lateral speed scale. It is used to measure range and speed and to set corrections for range and azimuth.

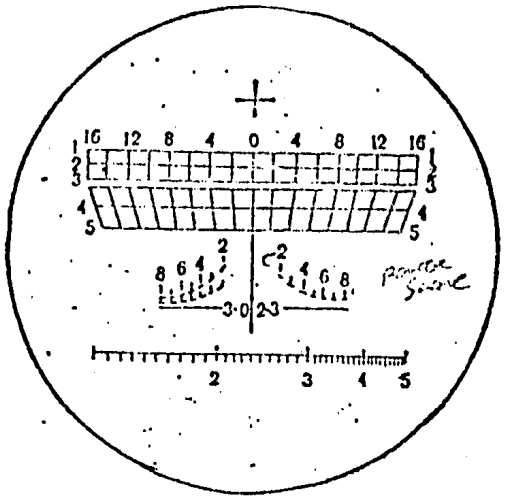


Diagram 5. Reticle

The cross-hairs at the tip of the reticle are used to determine the null line. In the middle of the reticle is the grid, on both sides of which are five horizontal lines indicated by the numbers numbers 1, 2, 3, 4, and 5 which represent distances of from 100 to 500

meters. The long vertical line in the center of the grid is the zero line, and to its right and left are [target] speed/wind [speed] scales whose grid marks [or graduations] represent up to 16 meters per second of either windage or the lead of a moving target. The range scale is found below and to both sides of the zero line. The upper curved [stadia] line on the left side is used to determine the range of targets 3 meters in height, while the lower curved line is used to determine the range of targets 1.5 meters in height. The curved line on the right is used to determine the range of targets 2.3 meters in height. Ranges of from 200 to 800 meters can be measured. The lowest horizontal line is used to measure [target] speed. It is divided into four sections which, going from left to right, measure the speed of a moving target at ranges of 200, 300, 400, and 500 meters.

Mounting socket: composed of a hand grip and a rod used to fix the position of the optical sights.

Illumination device: composed of a battery box (for dry-cell batteries), a socket, a bulb, and a switch. It serves to illuminate the graduated scales in the reticle.

b. Infrared Sights - composed of an infrared light, an azimuth knob, an elevation knob, a light shield, and storage batteries. It is used for aiming at night.

Infrared light: used to illuminate the target at night.

Azimuth knob: used to crank in windage and the lead of a moving target. Because the markings on the knob cannot be seen at night, the clicks caused by turning the knob must be used to set the corrections. Starting from the "0" point, every click represents one meter per second of correction, and the maximum correction that can be cranked in either clockwise or counterclockwise is seven meters per second. If the wind is coming from the right, the knob must be turned clockwise to crank in correction to the left. If the wind is coming from the left the knob must be turned counterclockwise to crank in correction to the right.

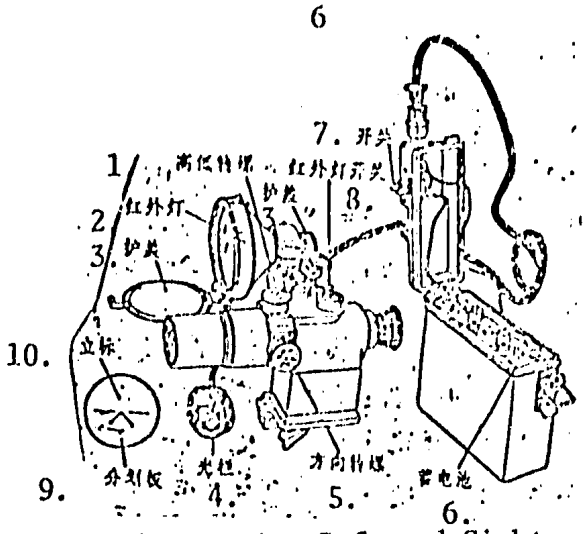


Diagram 6. Infrared Sights

Key:
1. Elevation knob
2. Infrared light
3. Covers
4. Light shield
5. Azimuth knob
6. Storage battery
7. Switch
8. Infrared light switch
9. Reticle
10. Index

Elevation knob: used to set the range amplitude. Starting from 100 meters, every click of the knob in a clockwise direction represents 50 meters. The maximum setting is 200 meters.

Light shield: in daytime it prevents the rays of the sun from entering the sight so as to protect the image intensifier within the sight. When the sight is used at night the shield should be taken off.

Storage battery: supplies electrical power to the sight and the infrared light.

c. Open sights - composed of the front and rear sights. Used for aiming.

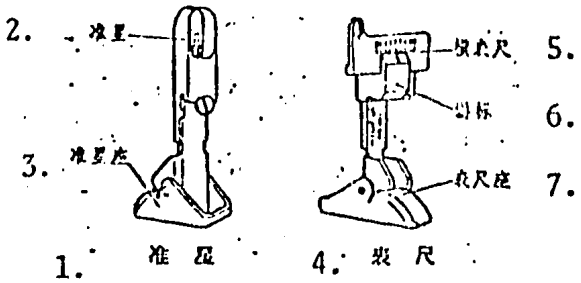


Diagram 7. Open Sights

Key:
1. Front sight
2. Bead
3. Front sight base
4. Rear sight
5. Deflection scale
6. Vernier
7. Rear sight base

Rear sight: composed of the rear sight leaf, the vernier, and the defelction scale. The rear sight leaf has grid markings one-through-five on it which represent 100 to 500 meters of range. The vernier indicates the necessary deflection to be read on the deflection scale. The deflection scale (the rear sight [peep hole]) is scribed with azimuth settings made up of a zero setting and eight [target] speed and wind [speed] settings to either side, each increment of which represents one meter per second of azimuth correction. The deflection scale is used to set windage and the lead of a moving target.

Front sight: composed of the front sight bead and cover. A wrench is inserted into the small hole on the top of the front sight cover to adjust the height of the sight.

5. Bipod - used to support the rocket launcher when it is fired. Both legs fold backwards and can be held in place against the clamp on the tube.

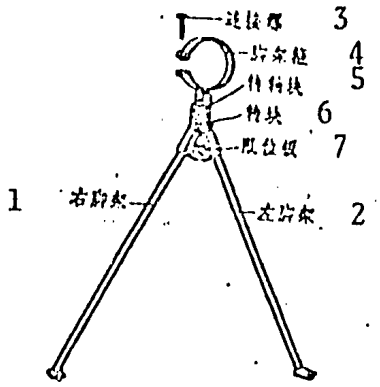


Diagram 8. Bipod

Key:
1. Right leg
2. Left leg
3. Bolt
4. Clamp
5. Swivel block
6. Swivel shaft
7. Bipod leg lock/restrainer

Accessories: used in disassembly and assembly, cleaning and oiling, carrying and repairing. Included are wrenches, a center punch, a disassembly/assembly tube [4592], a cleaning rod, a sling, and detectors [2914 2686 0892].

Spare Parts: firing pin and striker spring, one each.

Model 56 Rocket Launcher

The rocket launcher is composed of the barrel, the striker mechanism, the firing mechanism, and the open sights. It is also supplied with a set of accessories and spare parts.

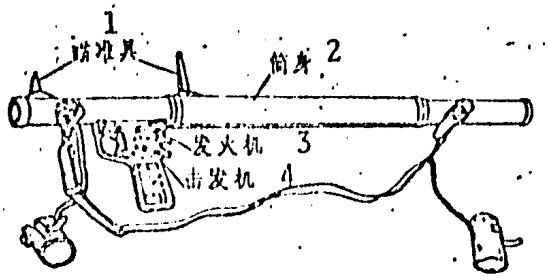


Diagram 9. Rocket Launcher

Key: 1. Open sights
2. Barrel, tube
3. Striker mechanism
4. Firing mechanism

1. Barrel - determines the direction taken by the rocket and of the backblast of gas that exits out the rear of the tube.

On the barrel are found the following: positioning slots which accommodate the positioning stud [ejection pin] on the rocket and which align the forward detector [ch'ien chien-ch'a-ch'i] in its position; a connecting lug by which the firing mechanism is affixed to the tube; a striker mechanism base to which the striker mechanism is attached; and an exhaust hole on the right side of the striker mechanism base by which the explosive gas that leaks out of the firing pin hole is expelled.

2. Firing Mechanism - is composed of the trigger, the percussion lock, the hammer, the safety, and a push rod with a spring. The mechanism is used to fire the rocket and to provide a safety device.

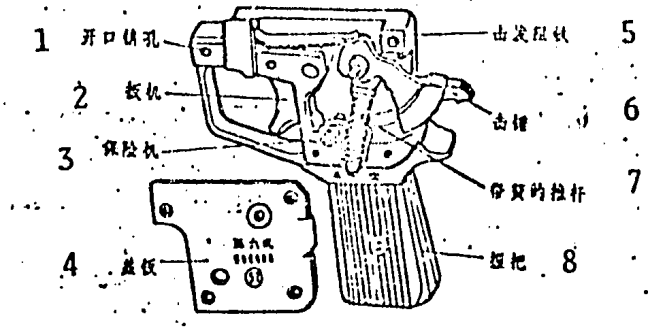


Diagram 10. Firing Mechanism

Key:
1. Pin hole
2. Trigger
3. Safety
4. Cover plate
5. Percussion lock
6. Hammer
7. Push rod with spring
8. Pistol grip

3. Striker Mechanism - is composed of the firing pin, the striker spring, an adaptor nut, a coupling ring, a washer, a spacer, and a pin. It strikes the percussion cap to detonate the rocket.

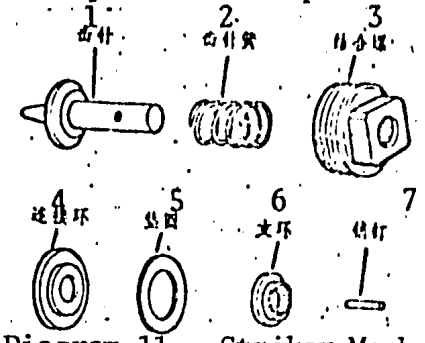


Diagram 11. Striker Mechanism

Key:
1. Firing pin
2. Striker spring
3. Adaptor nut
4. Coupling ring
5. Washer
6. Spacer
7. Keeper pin

4. Open Sights - composed of rear and front sights. Used for aiming. The rear sight has three slots [peep holes] which correspond to 50, 100, and 150 meters of range.

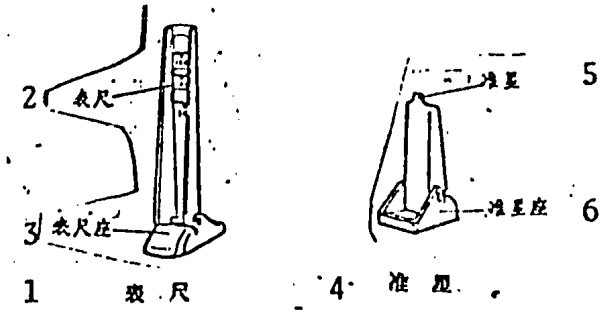


Diagram 12. Open Sights

Key:
1. Rear sight
2. Rear sight leaf
3. Rear sight base
4. Front sight
5. Bead
6. Front sight base

Accessories: used in disassembly and assembly, cleaning and oiling, carrying and repairing. Included are wrenches, a center punch, a disassembly/assembly tube [4592], a cleaning rod, a sling, a detector [2914 2686 0892], front and rear barrel covers, a rotary sleeve [6567 4592] and a thrust collar mounting [2236 3883 2665].

Spare Parts: a complete striker mechanism, minus the adaptor nut.

B. Disassembly and Assembly

Disassembly and assembly are undertaken in order to clean, oil, inspect, and repair the rocket launchers. They should be done in a prescribed order and according to proper procedures, and the parts should not be forced or manhandled. As the parts are disassembled, they should be laid out on a dry and clean flat surface in the order in which they are taken apart. Without special permission, any parts not discussed below should not be disassembled.

1. Disassembly

a. Removing the striker mechanism - cock the hammer, engage the safety, loosen the adaptor nut, take off the striker mechanism, release the safety, and return the hammer [to its uncocked position].

b. Disassembling the striker mechanism - take out the firing pin and the striker spring (on the Model 56 rocket launcher, take out the washer, press down on the spacer, and then pull out the keeper pin, the spacer, the striker spring, and the coupling ring).

c. Removing the firing mechanism (which is not usually taken apart) - use a wrench to loosen the bolt which connects the connecting lug with the firing pin chamber two turns, tap the head of the bolt, and use an awl to push the keeper pin out of the pin hole, thereby disengaging the entire mechanism. (On the Model 56 rocket launcher, tap out the cotter pin to disengage the firing mechanism).

d. Disassembling the firing mechanism (which is not usually taken apart) - loosen the screws that hold down the cover plate and remove the plate. Then, with your right hand holding the grip, use your left hand to insert a center punch into the opening at the end of the push rod, and tap the trigger and take out the hammer and the push rod with its spring (Diagram 13). Then take out the push rod and its spring and stick the end of the spring that is held by the center punch into the disassembly/assembly tube; press the end of the push rod down onto a wooden board, and then place a wrench crosswise into the slot at the end of the tube, press down on the wrench, pull out the center punch, gradually release pressure on the assembly tube, and take out the push rod spring (rf. Diagram 14).

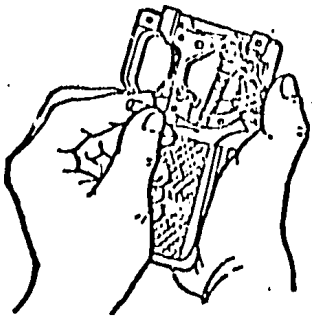


Diagram 13. Inserting the center Punch into the Hole

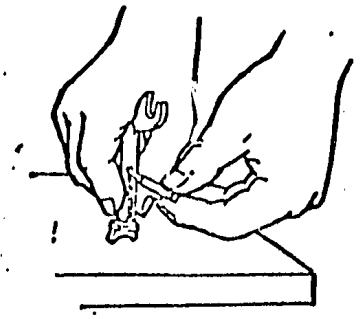


Diagram 14. Separating the Push Rod from its Spring

2. Assembly

a. Assembling the firing mechanism - first place the spring over the push rod, place the end of the push rod down on a wooden board, slip the disassembly/assembly tube over the spring and the push rod, and, with your right hand place a wrench crosswise into the slot at the end of the tube and press downward, and then with your left hand insert the center punch into the opening at the end of the push rod and slip off the disassembly/assembly tube. Then with your right hand holding the grip, tap the trigger and use your left hand to install the push rod with its spring and the hammer. With the thumb of your right hand pressing down on the hammer, pull out the center punch with your left hand. Then put on the cover plate and tighten the screws that hold it down.

b. Attaching the firing mechanism - place the assembled firing mechanism up against the barrel of the rocket launcher, insert the keeper pin, and tighten the bolt (on the Model 56 rocket launcher, insert the cotter pin).

c. Assembling the striker mechanism - with one hand holding the tail end of the firing pin, fit the striker spring over it and fit the two into the adaptor nut (on the Model 56 rocket launcher, grasp the pointed end of the firing pin with your left hand and with your right hand slip on the coupling ring, the striker spring, the spacer, and the washer. Press down on the spacer and insert the keeper pin).

d. Installing the striker mechanism - cock the hammer, insert the striker mechanism, tighten the adaptor nut, return the hammer [to its uncocked position], and engage the safety.

III. Names of Parts, Their Uses, and Firing the Rocket

A. Names of Parts and Their Uses

Model 69 Rocket

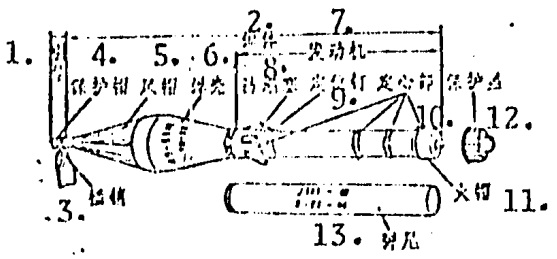


Diagram 15. Rocket

Key:
1. Fuze
2. Rocket body
3. Pin
4. Protective cap
5. Ballistic cap
6. Casing
7. Rocket motor
8. Moisture-resistant seal
9. Positioning stud
10. Centering section(s)
11. Percussion cap
12. Protective Cover
13. Tail

1. Fuze - used to ignite the explosive charge. The fuze is covered by a protective cap which serves to protect the piezoelectric crystal [1090 7193 2533 7555] inside the fuze.

2. Rocket Body - used primarily to hold the explosive charge. It is composed of the ballistic cap, the casing, the cone-shaped filler, and the motor. At the time of detonation, the cone-shaped filler produces a high-temperature, high-pressure directional air flow which destroys enemy tanks, armored vehicles, and fortified installations (Diagram 16). The motor is used to increase the range of the rocket. The forward end of the motor has a flame vent [0899 3499 1313] and a positioning stud [ejection pin], and there is a percussion cap on the rear end. When the rocket is between 15 and 20 meters from the rocket launcher tube, the motor begins to function.

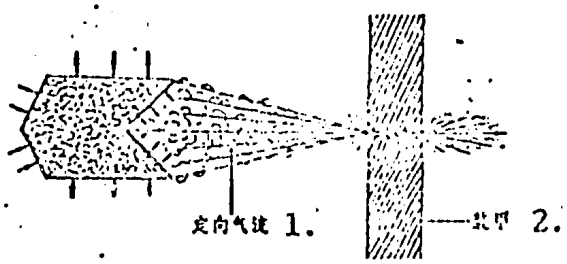


Diagram 16. The Rocket as it Pierces Armor

Key: 1. Directional air flow
2. Armor

3. Tail - is composed of the propellant, the boom, the fins, and the rotating vanes. Used to fire the rocket and maintain stability of the rocket in flight.

The boom is threaded onto the rocket body, and on its end are located four fins and rotating vanes, the blades of which are angled in such a way as to make the rocket rotate at a fixed rate as it speeds through the air, thereby ensuring that the four fins extend fully outward to maintain the stability of the rocket in flight.

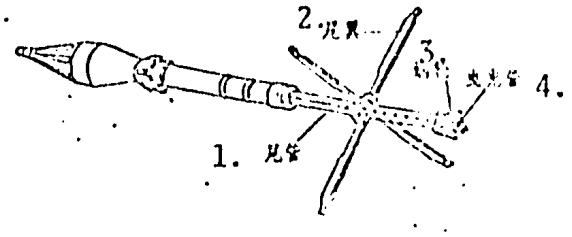


Diagram 17. Tail of the Rocket

Key: 1. Boom
2. Fin
3. Rotating vane
4. Tracer tube [2576 0342 4619]

Model 56 Rocket

The rocket is composed of the rocket body, the fuze, the tail, and the cartridge case [powder charge].

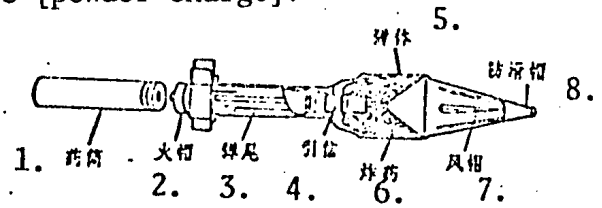


Diagram 18. Rocket

Key: 1. Powder charge
2. Percussion cap
3. Tail
4. Fuze
5. Rocket body
6. Explosive charge [filler]
7. Ballistic cap
8. Non-skid cap

1. Rocket Body - used to hold the explosive charge. It is composed of the ballistic cap, the casing, and the cone-shaped filler.

At the time of detonation, the cone-shaped filler produces a high-temperature, high-pressure directional air flow which pierces enemy tanks, armored vehicles, and fortified installations (rf. Diagram 16). On the front of the rocket body is a non-skid cap to prevent the rocket from skidding or bouncing when it strikes the target. At the end of the rocket body is the fuze nest [1714 0207 1560] to allow for installation of the fuze and a threaded coupling by which the tail is attached to the body.

2. Fuze - used to ignite the rocket body [ie., the filler within]

3. Tail - used to maintain stability of the rocket in flight.

4. Cartridge Case [Powder Charge] - filled with a propellant which, when ignited, produces a backblast of gas that propels the rocket forward.

B. Firing

When the firing pin strikes the percussion cap, the percussion cap is fired and in turn ignites the ignition charge [igniter] in the flash hole which initiates the propellant in the tail (in the cartridge case of the Model 56 rocket), and this produces a backblast of gas which propels the rocket forward.

IV. Maintenance and Repair

"Our duty is to hold ourselves responsible to the people." Caring for weapons and equipment is an important responsibility for all revolutionary fighters and a regular part of war preparedness procedures. It is also an effective way to prevent mechanical breakdowns. To this end, it is imperative that you diligently inspect and clean the weapons, avoid damaging them through rough handling, and do not lose them.

A. Caring For the Weapons

1. The weapon, the ammunition, and the optical sights should be kept in a safe, dry, and well-ventilated place. Protecting the weapon from moisture is especially important in misty, rainy, and damp areas and tunnels. Excessive exposure to sunlight and heat should be avoided. When not in use, the front and rear open sights should be folded down, the handle should be folded down toward the left side of the barrel, the hammer should be left in the uncocked position, and the safety should be engaged (and on the Model 56 rocket launcher the front and rear barrel covers should be put on).

2. The rocket launcher should be cleaned after every firing session. After all parts have been cleaned, the unpainted metal parts should all be coated with a film of oil. The optical sights should be cleaned with cotton or other soft wiping cloths, and they should never be oiled. Before firing under extremely frigid conditions, wipe the grease off the firing pin and [dry] fire the weapon two, three, or four times to be certain that the firing pin strikes the percussion cap with a force sufficient to detonate it. To clean the weapon after firing, first remove the firing and striker mechanisms and then clean the residue from the smoke off the inside [bore] of the barrel and the striker mechanism base with soapy water or a soda solution. Then rinse them in clear water, wipe them dry, and apply a coating of oil. The weapon should be cleaned again every three or four days thereafter. Whenever the weapon is exposed to poisonous or radioactive materials, it should be thoroughly cleaned.

3. Inspect the open sights to make certain that the front and rear sight leaves will fold up and down freely. Inspect the firing and safety mechanisms by cocking the hammer, engaging the safety, and squeeze the trigger to make certain that the weapon does not fire. Then release the safety, squeeze the trigger, and observe if the hammer strikes the firing pin with sufficient force. Inspect the striker mechanism by pressing on the end of the firing pin to make certain that the firing pin returns to its original position once it is released. Inspect the accessories and spare parts to make certain that they are complete and in good shape.

B. Repairs [Trouble Shooting]

If troubles develop while firing the weapon, the cause of the trouble must be traced down immediately and repairs must be promptly undertaken. The table below lists some of the most common troubles and the methods used to correct them.

Trouble	Cause of Trouble	Solution
Failure to Fire	1. Rocket not loaded in proper position in chamber for firing	1. Align positioning stud on rocket with positioning slot on barrel
	2. Percussion cap fails	2. Change rockets
	3. Point of firing pin is worn	3. Change firing pins
Rocket Will Not Load Into Proper Position	1. Too much soot and dirt in the bore of the barrel	1. Clean the bore of the barrel
	2. Percussion cap protrudes	2. Change rockets
	3. Striker spring is broken or ineffective	3. Change striker springs

RANGING

Accurate ranging is the basis for choosing the sight graduation and the aiming point. For this reason, one must practice frequently and become thoroughly familiar with the basic methods of ranging.

I. Ranging with the Optical Sight

When using the range line in the optical sight to compute distance, first judge the target's elevation, then, in accordance with its elevation, select the corresponding curved range line on the reticle. To make the range measurement, align the point in the middle of the tank where it touches the ground with the horizontal line which is situated below the curved range line, and the number where the top of the tank (the turret) touches the curved range line will be the distance. For instance, when taking the range of a tank with an elevation of 2.3 meters, Diagram 19 shows the distance to be 300 meters.

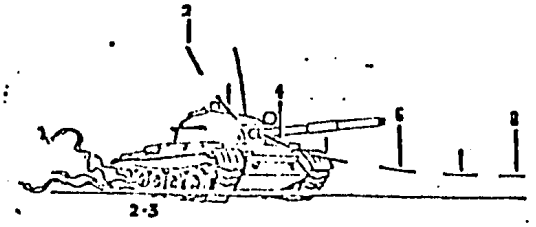


Diagram 19. Ranging with the Optical Sight

II. Ranging with the Open Sights

When using the open sights on the Model 156 rocket launcher to range, grasp the barrel in the prescribed manner and sight with the rear sight about eight centimeters from the eye. Using the broad rectangular area below the point of the front sight, by comparing the breadth of the rectangle with the breadth of targets at different distances, one can guage an approximate range. For instance, when the large part of the front sight covers a medium tank completely, the range is about 100 meters. (Diagram 20)

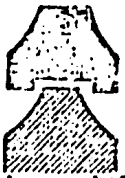


Diagram 20. Ranging with the Open Sight

III. Ranging by Comparison

By comparing the distance of the target with distances in areas which had a deep impression upon one's memory (eg. the 100 meter firing range), or if one already knows the distances [of objects] in the present area, one can arrive at an approximate range.

One can also divide the distance to be measured into several approximately equal sections, then measure one of the sections and multiply that distance by the number of sections and thus estimate the range.

One should strive for accuracy in ranging. The permissible error should not exceed 15 percent under good visibility and 20 percent under poor visibility.

FIRING PROCEDURES

Firing procedures are tha basis of accurate firing and the focal point of firing practice. One must practice diligently, make strenuous demands of oneself, practice repeatedly, and become thoroughly familiar with the correct firing procedures.

I. Loading and Extracting the Rocket

The Model 69 Rocket Launcher

A. Loading and Extracting in the Prone Position

On the command "Prone position...Load," the gunner rotates the tube to the front of his right shoulder, his left hand grasping the hand guard, and his right hand lifting the handle. He opens the bipod with his left hand and simultaneously takes a long step forward with his left leg. The tube is oriented toward the target and the bipod is placed on the ground (Diagram 21), with the handle turned toward the right side. With both hands gripping the left side of the tube, he extends both legs simultaneously to the rear and drops to the prone position (the body and the tube should form an angle of not less than 40 degrees). With the left hand he takes out the optical sight, seats it in the sight mount and locks it in place (when using the open sight, he flips the sights up) and then grasps the hand guard behind the sight. With the right hand he grasps the pistol grip from the left side of the tube, engages the safety and helps the assistant gunner load the rocket. Eyes front, prepare to fire.

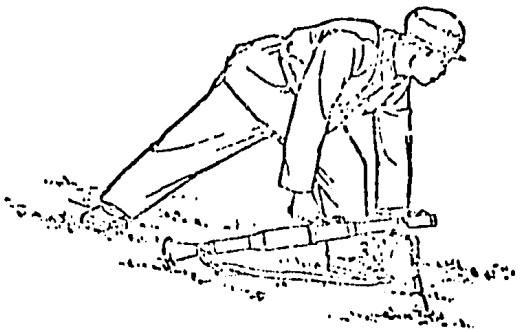
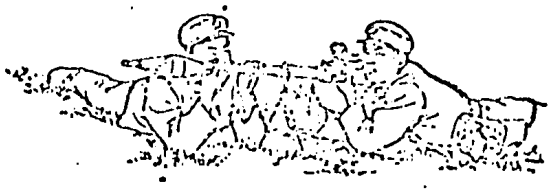


Diagram 21. Placing the Launcher

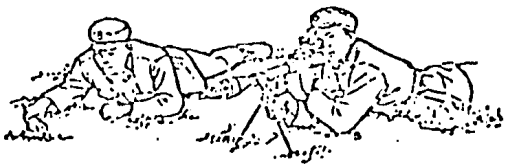
The assistant gunner (standing to the right of the gunner) takes one large stride forward with his right foot, uses both hands to place the ammunition backpack crosswise on the ground in front of his right foot, places both hands on the ground, stretches both legs simultaneously to the rear and assumes the prone position quickly. He opens the ammunition backpack and extracts a rocket; he takes the protective cover off the rocket body, opens the moisture-proof casing on the rear of the rocket head, takes out the rocket tail, screws the rocket tail onto the rocket body to the stop, removes the fuze safety pin, takes off the fuze safety cap, moves bodily toward the muzzle of the rocket launcher, and, with the aid of the gunner, loads the rocket into the body of the tube, causing the positioning stud to enter the positioning slot all the way to the stop. Thereupon he returns to his original position and prepares another round. (Diagram 22)

Loading



装弹时姿势

After Loading



装弹后姿势

Diagram 22. Prone Position Loading

On the command "Extract Rockets....Stand," the gunner uses his left hand to take off the optical sight and places it in the sight case (when using the open sights, the open sights are folded down), places both hands on the ground to raise his body, brings the right foot forward one step, then the left foot, grasps the tube

handle with his right hand and raises the tube, places his right foot next to his left foot, closes the bipod with his left hand, grasps the hand guard, and with the right hand he turns the handle to the left side of the tube and grasps the sling. With both hands he revolves the tube up onto his right shoulder and comes to the position of attention.

The assistant gunner extracts the rocket, unscrews the rocket tail, replaces the protective cover, puts the fuze safety cap in position, replaces the fuze safety pin, places the rocket in the backpack and closes the pack. With both hands on the ground, he raises himself, brings the right foot forward one step, then the left foot. With both hands crossed grasping the backstrap, and while bringing the right foot alongside the left foot, he places the backpack on his back, resuming the position of attention.

B. Loading and Extracting in the Kneeling Position

On the command "Kneeling position....Load," the gunner rotates the launcher to the front of his right shoulder. The left hand grasps the hand guard. While moving his left foot one large pace in front of his right foot, he kneels with the right knee pointing to the right, the buttocks resting on the right heel and the left shin almost perpendicular to the ground. The left hand positions the launcher tube between the right upper arm and the body (or on the outside of the right upper arm). The right hand grasps the pistol grip from the right (left) side and engages the safety. The left hand extracts the optical sight, places it in the sight mount and locks it in place (when using the open sight, flip up the open sight), and moves to grasp the hand guard behind the sight. With his left forearm on his left thigh, he assists the assistant gunner to load the rocket. Eyes front, prepare to fire.

The assistant gunner takes one large stride forward with the right foot, kneels, the left knee dropping to the left, simultaneously placing the backpack on the ground. Taking the rocket from the pack and assembling it, he loads the rocket into the launcher with the aid of the gunner (Diagram 23). Thereupon, he returns to his former kneeling position and prepares another round.

Diagram 23. Kneeling Position Loading

On the command "Extract Rockets....Stand," the gunner removes the optical sight with his left hand and places it in the sight case (when using the open sight, he close it), and grasps the hand guard; with the right hand he grasps the the sling and stands up; he brings his right foot next to the left foot. He uses both hands to revolve the tube up onto his right shoulder and resumes the position of attention.

The assistant gunner extracts the rocket, packs up and puts on the backpack and resumes the position of attention.

C. Loading and Extracting in the Standing Position

On the command "Standing position....Load," the gunner rotates the launcher tube to the front of his right shoulder, the left hand grasping the hand guard, and while pivoting a half turn to the right on his right foot, brings the left foot forward one pace, places the launcher between his right upper-arm and side (or on the outside of his right arm); with the right hand he grasps the pistol grip from the right (left) side of the tube and engages the safety; with the left hand he takes out the optical sight and places it in the sight mount (or when using the open sight, flips it up), and then grasps the hand guard behind the sight, and then helps the assistant gunner to load the rocket (Diagram 24). Eyes front, prepare to fire.

The assistant gunner pivots on his left foot a half turn to the left, the right foot takes one large pace forward, simultaneously placing the backpack on the ground he takes out a rocket and assembles it, and with the aid of the gunner, loads it into the launcher. Thereupon, he returns to his original position and prepares another round.

Diagram 24. Standing Position Loading

On the command "Extract Rockets...." the gunner with his left hand takes off the optical sight and places it in the sight case (or when using the open sight, closes it), and then grasps the hand guard. With the right hand he grasps the sling, and while placing the right foot alongside the left foot, with both hands he revolves

the tube up onto the right shoulder and resumes the position of attention.

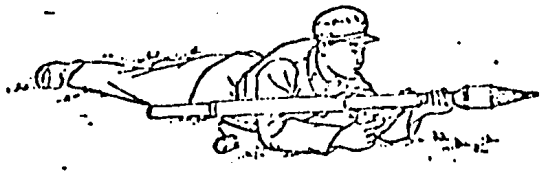
The assistant gunner extracts the rocket, packs and shoulders the backpack, and resumes the position of attention.

The Model 56 Rocket Launcher

A. Loading and Extracting in the Prone Position

On the command "Prone Position....Load," the gunner rotates the tube to the front of his right shoulder, with his left hand he grasps the hand guard, supports the tube with his left hand and simultaneously moves his left foot one pace in the direction pointed by his right foot (or the right foot may be moved forward one large pace in the direction it is pointing). He places his left hand on the ground in front of the left (right) foot, and quickly rolls over on his back. With his left hand he grasps the hand guard, with his right hand he takes off the front and rear barrel covers, and grasps the pistol grip from the left side of the tube, and then he turns over onto his stomach (with the body at an angle greater than 30 degrees with the tube), causing the pistol grip and the rear end of the tube to rest on the ground, and engages the safety. With his left hand he reaches back and grasps the rocket between his thumb and index finger, and loads the rocket into the launcher, causing the positioning stud to enter the positioning slot to the stop. He then raises the open sight and grasps the hand guard behind the sight. Eyes front, prepare to fire. (Diagram 25)

Loading



装弹时姿势

After Loading

装弹后姿势

Diagram 25. Prone Position Loading

The assistant gunner, (standing on the left side of the gunner), takes one large step forward with his left foot, with both hands he places the ammunition pack crosswise on the ground in front of his left foot, puts both hands on the ground, throws both feet backward and quickly assumes the prone position. He opens the backpack, takes out and assembles a rocket, grasps the rocket body with the right hand and hands the rocket tail forward to the gunner and then prepares for another round.

On the command "Extract rockets.....Stand," the gunner folds down the sights with his left hand, extracts the rocket from the launcher, and after handing it to the assistant gunner, grasps the hand guard, and rolls a bit to his right. With the right hand he removes the front and rear barrel covers, grasps the hand guard and brings the tube close to his body while also bringing his left forearm close to his body. He bends his left leg under his right leg. Using the left hand and left leg, he raises his body off the ground. He brings his right foot forward one pace, then the left foot, he transfers the tube to the left hand, the right hand grasping the sling. He brings his right foot next to his left foot, rotates the tube up onto his right shoulder, and resumes the position of attention.

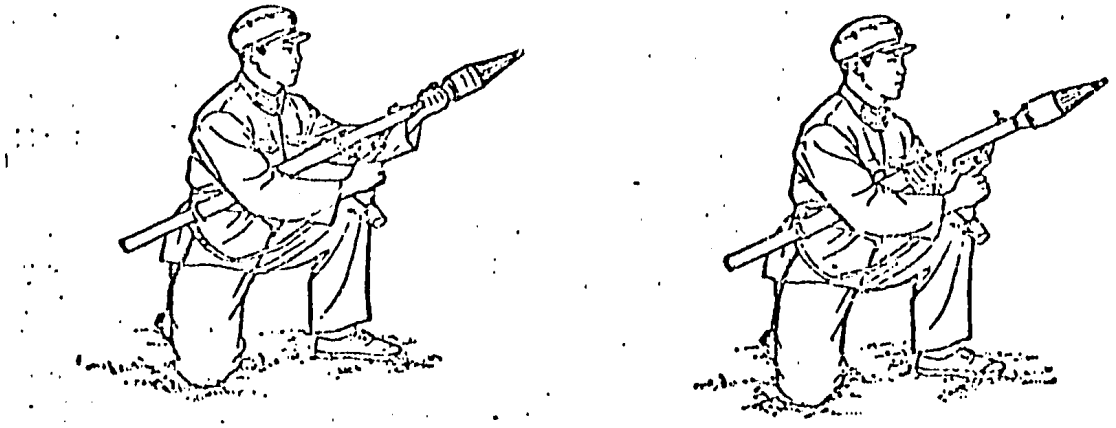
The assistant gunner receives the rocket, screws off the powder-charge tube, puts the safety cap in place, places the rocket into the backpack and closes the pack. Putting both hands on the ground, he raises himself, moves his right foot forward one step, then his left foot. With his hands crossed, he grasps the backstrap of the pack, and while placing the right foot beside the left, shoulders the backpack and resumes the position of attention.

B. Loading and Extracting in the Kneeling Position

On the command "Kneeling position.....Load," the gunner rotates the tube to the front of his right shoulder. The left hand grasps the hand guard. At the same time, he moves his left foot one large step forward of the right foot and kneels with the right knee pointing to the right with the buttocks coming to rest on the right heel and the left shin assuming an almost vertical position. With his right hand he removes the front and rear barrel covers. With his left hand he positions the tube between the right upper arm and right side (or on the outside of the right arm), the right hand grasping the pistol grip from the right (left) side of the tube and closing the safety. With his left hand he reaches backward and grasps the rocket between the thumb and the index finger and inserts it into the tube. Then he raises the sights, grasps the hand guard behind the sight, and places his left forearm on his left thigh. Eyes front, prepare to fire (Diagram 26).

The assistant gunner takes one step forward with his left foot, kneels with his right knee pointing to his right, simultaneously placing the ammunition pack on the ground, withdraws and assembles

a rocket, presenting it to the gunner. Thereafter he prepares another round of ammunition.



Loading After Loading

Diagram 26. Kneeling Position Loading

On the command "Extract rockets.....Stand," with his left hand the gunner folds down the sights, extracts the rocket, hands it to the assistant gunner and grasps the hand guard; with his right hand he places the front and rear barrel covers on the tube, and grasps the sling; he quickly stands erect, and placing his right foot next to the left foot, he rotates the tube onto his right shoulder, resuming the position of attention.

The assistant gunner receives the rocket, packs and shoulders the backpack, and resumes the position of attention.

C. Loading and Extracting in the Standing Position

On the command "Standing position....Load," the gunner rotates the tube to the front of his right shoulder, the left hand grasping the hand guard and simultaneously pivoting on the right foot for a one half-turn to the right. He extends his left foot forward one pace, positioning the tube between the right upper arm and the right side (or on the outside of the right arm), with his right hand he takes off the front and rear barrel covers, grasps the pistol grip from the right (left) side of the tube, and engages the safety. He extends his left hand to the rear, grasps the rocket between his thumb and index finger, loads it into the tube and then raises the sights, and grasps the hand guard behind the sights. Eyes front, prepare to fire (Diagram 27).

Loading

After Loading

Diagram 27. Standing Position Loading

The assistant gunner pivots on his right foot halfway to the right, moves his left foot forward one pace, simultaneously placing the ammunition pack on the ground; he extracts and assembles a rocket, and gives it to the gunner, after which he prepares another round.

On the command "Extract rocket," the gunner uses his left hand to fold down the sights and extract the rocket. After he hands it to the assistant gunner, he grasps the hand guard; with his right hand he puts the front and rear barrel covers in place, and grasps the sling. While bringing his right foot alongside the left foot, he rotates the tube onto his right shoulder and resumes the position of attention.

The assistant gunner receives the rocket, packs and shoulders the ammunition pack, and resumes the position of attention.

II. Aiming

Aiming is the prerequisite of accurate firing. For this reason, during aiming practice, be conscientious and thorough and strive for perfection.

A. Accurate Aiming

When using the optical sight, align the point where the center zero line of the reticle intersects the appropriate horizontal [range] line and the center of the target (Diagram 28). When aiming, a yellow or a grey light filter may be attached to the protective frame depending

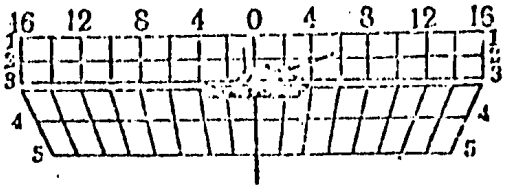


Diagram 28. Correct Aiming with the Optical Sight

on the ambient light condition. When the light is strong, the grey filter may be attached; when the light is weak, the yellow filter may be used.

When using the open sights, the right eye sights through the peephole slot, past the front sight, aligning the pointed part of the front sight [bead] with the center of the slot in the peephole, and aligning the top of the slot with the top of the front sight, and point it at the target (Diagram 29).

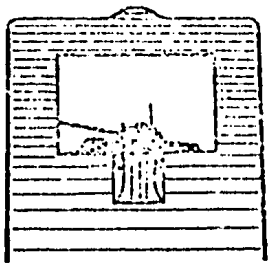


Diagram 29. Correct Aiming with the Open Sights

Aiming must be meticulous, not sloppy, or haphazard. Failure to align the top of the slot with the top of the front sight will cause the projectile to err. If the front sight is high, the projectile will go high; if the front sight is low, it will go low; if the front sight is off to the left, the projectile will deviate to the left, if it is off to the right, the projectile will go wide to the right. If the front sight is one millimeter lower than the slot, at a range of 50 meters, the deviation will be 16 centimeters (for the Model 56 rocket launcher, it will be 22 centimeters). For every increment of 50 yards, the deviation will double. For this reason, when aiming, one must concentrate his attention on keeping the correct relation between the front sight and the peephole slot.

B. Checking the Aiming

1. Individual Checks

When aiming, move the front of the tube up and down a bit, checking to see that the front sight is positioned in the center of the peephole slot; move the front of the tube to the left and right

a bit, checking to see that the top of the front sight is level with the top of the slot in the peephole.

One can also use a piece of white paper as an obstruction for inspection. After the gunner sights on the target, the inspector covers the target by placing a piece of white paper in front of the gunner's front sight, and the gunner looks to see the relationship between the front sight and the slot against the white paper background. Then the paper is removed, and the gunner again aims at the target and this is repeated for practice.

2. Stationary Inspection

Place the tube on a stationary rest. After the gunner has aimed at the target, he does not move the tube, and a mutual inspection of aiming accuracy is made.

3. Use an inspection scope to inspect.

III. Holding the Tube, Sighting, Firing

Holding the tube, sighting, and firing are three interrelated and interconnected actions. A solid grasp of the tube, and accurate aim, and an even, decisive firing are the key to accurate fire. For this reason, practice must be rigorous and familiarity must be grasped.

A. Holding the Tube

1. Using the Tube with a Rest

a. With a Rest in the Prone Position (Diagram 30)

Use both hands to place the tube on the right shoulder. With the tube positioned between the thumb and the index finger of the left hand, move the left hand forward so that the palm of the hand grasps the hand guard behind the rear sight, thumb forward and the four fingers pressing down on the body of the tube. Grasp the pistol grip with the right hand (for the Model 56 launcher, position the grip on the rest), the wrist is kept straight, the index finger is on the trigger and engages the safety. The left forearm is kept close to the right wrist, the two elbows firm on the ground, the two arms exert pressure to keep the tube steady, the cheek comes to rest naturally.

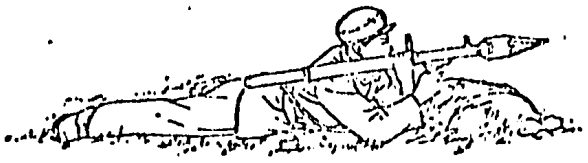


Diagram 30. Holding the Tube in the Prone Position with Rest

b. Kneeling Position within an Emplacement, with Rest (Diagram 31)

Normally, one kneels on the left knee, with the right shin in vertical position or with the right foot slightly to the right rear. The right hand grasps the pistol grip, and with both hands the tube is lifted to the right shoulder. The left hand, thumb forward, grasps the hand guard behind the rear sight, pulling down slightly, both elbows rest on the embankment, with the left front of the body touching the wall of the embankment. The tube is steadied with both arms. The rear end of the tube should be higher than the trench wall behind the gunner.

Diagram 31. Holding the Tube in the Kneeling Position in Emplacement with Rest

c. Standing Position within an Emplacement with Rest (Diagram 32)

The legs are parted, with the left leg slightly bent, the right leg extended comfortably to the rear, soles flat on the ground, with the upper body close to the wall of the emplacement. Otherwise, the position is the same as when kneeling.

Diagram 32. Holding the Tube in the Standing Position in an Emplacement with Rest

2. Holding the Tube without a Rest

a. Holding the Tube in the Prone Position without a Rest (Diagram 33)

With both hands bring the tube up onto the right shoulder. The left hand, palm upwards, thumb and index finger forward, grasps the hand guard behind the rear sight, the fingers pulling down slightly. The right hand grasps the pistol grip, and, with the index finger on the trigger, releases the safety. The left elbow should be pulled inward as much as possible, the right upper arm extended a bit to the outside, and the left forearm pressed against the right wrist to steady the tube with constant pressure. The cheek rests naturally.

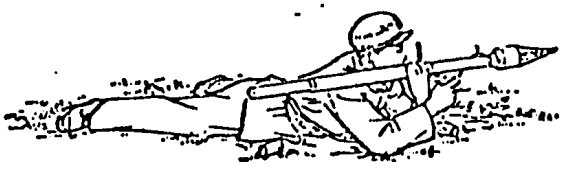


Diagram 33. Holding the Tube in the Prone Position without Rest

b. Holding the Tube in the Kneeling Position without Rest (Diagram 34)

The left elbow is placed on the left knee, the left hand grasps the hand guard behind the sight, pulling down with a slight force. The right arm is naturally vertical, the inside of the right forearm touches the outside of the left forearm (or the right forearm may be placed on the inside of the left thigh), the two forearms press together, steadying the tube.

Diagram 34. Holding the Tube in the Kneeling Position without Rest

c. Holding the Tube in the Standing Position without Rest (Diagram 35)

The feet are spread about as far apart as the width of the shoulders, with the weight equally distributed on both feet. Both upper arms press against the chest, the left hand grasping the hand guard behind the rear sight, pulling down slightly to steady the tube.

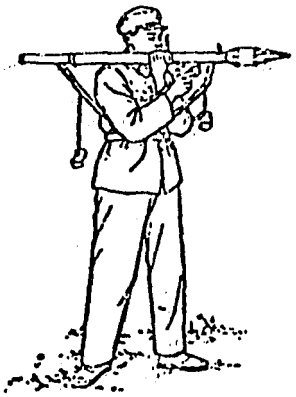


Diagram 35. Holding the Tube in the Standing Position without Rest

B. Aiming

Having grasped the tube correctly and having selected the appropriate grid marking or [open] sight graduation on the basis of the range of the target, proceed to aim in accordance with correct aiming procedures. If the sighting lines move off-target, adjust your body or move your elbows. Aiming should be smooth and accurate, and the time should not be extended too much to avoid any blurring of vision and resultant deviations in aim.

C. Firing

When accurate aim is achieved, one should hold his breath, open his mouth naturally, and evenly and decisively depress the trigger. During the firing sequence, the relation of the peepsight slot and the front sight must be kept accurately correct, and one should not release his breath, shrug his shoulders, or blink his eyes. He should especially not jerk the trigger in order to take a quick shot at the target.

IV. Selection of Sight Graduation and Aiming Point

Selection of the sight graduation and the aiming point is determined by the range of the target, its size, and the height of the trajectory at different ranges.

A. Use of the Optical Sight in Aiming

When using the optical sight for aiming, whatever the range in hundreds of meters to the target, the horizontal line corresponding to that distance is aligned with the center of the target at that line's intersection with the vertical center zero line. When firing at targets 150, 250, 350, or 450 meters away, the space between the two nearest distances is aligned with the target. For instance, when firing at a target at 150 meters, the space between the 1-2 horizontal lines is centered on the target.

B. Using the Open Sights to Aim

1 Whatever the range of the target in hundreds of meters, that number is set on the open sight vernier and aim is taken on the center of the target.

2. When the range of the target is greater (less) than that on the vernier scale, the [an?] intermediate graduation can be used, raising or lowering the aim point as appropriate.

For correction of the aiming point, consult the following tables:

Aimpoint Correction Table for the Model 69 Rocket Launcher

(1) 射距(米)	150		250		350		450	
(2) 表尺	1	2	2	3	3	4	4	5
(3) 瞄准点高低修正量(米)	−0.4	0.4	−0.9	0.9	−1.3	1.3	−1.9	1.9

Key: 1. Range (meters)
2. Vernier setting
3. Aimpoint correction (meters)

Aimpoint Correction Table for Model 56 Rocket Launcher

(1) 射距(米)	25	60	70	75	80	90
(2) 表尺	50	50	50	100	100	100
(3) 瞄准点高低修正量(米)	0.5	−0.3	−1.2	1.4	1.2	0.8

Key: 1. Range (meters)
2. Vernier setting
3. Aimpoint correction (meters)

V. The Affects of Wind on the Projectile and Correction

Chairman Mao instructs us: "If a man wants to succeed in his work, that is, to achieve the anticipated results, he must bring his ideas into correspondence with the laws of the objective external world." When firing while the wind is blowing, the wind can cause the projectile to deviate in its flight: the greater the force of the wind, the greater the deviation. In order to accurately hit the target, one must learn to accurately judge the wind direction, the wind strength, and the methods of compensation.

A. Determination of Wind Direction and Wind Strength

1. Wind directions are divided into cross wind, oblique winds, and longitudinal winds (either head or tail winds).

2. Wind strengths are divided into weak, light, and strong.

3. Determination of wind strength and wind speed.

Weak wind: wind speed is 2-3 m/s, equal to a force-2 wind. Related effects: slight movement of flags, grass and light tree branches.

Light wind: wind speed is 4-7 m/s, equal to a force-3-4 wind. Related effects: flags open and wave, grass moves unceasingly, small tree branches move.

Strong wind: wind speed is 8-12 m/s, equal to a force-5-6 wind. Related effects: flags are blown straight out and snap in the wind, the grass is blown down, and heavy tree branches move.

B. Methods of Compensation

Model 69 Rocket Launcher

Because the body of the rocket is relatively long, the head heavy and the tail light, during its trajectory through a cross wind, the wind blows the tail in the direction toward which the wind blows, causing the head to move in an upwind direction. Because the propulsive force is supplied by the tail, a deviation into the wind is produced (Diagram 36). In order to accurately hit the target, the gunner must make corrections.

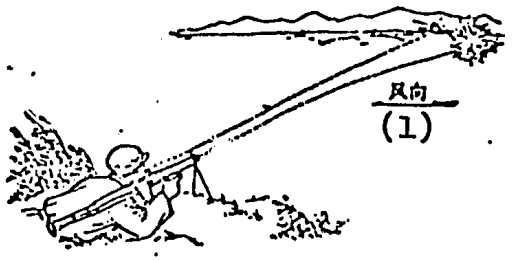


Diagram 36. The Effect of Cross Wind upon a Projectile

Key. 1. Wind direction

1. Corrections for cross winds

First, determine the wind speed at the time of firing, then set the indicator at this windage correction mark on the deflection scale on the side of the scale from which the wind is blowing. For instance, if a 4 m/s cross wind is blowing from the right, when using the optical sight, align the "4" speed/wind line on the right hand side of the center zero line of the reticle grid with the target; when using the open sight, align the "4" on the right side of the central

"0" on the deflection scale with the engraved mark on the vernier slide and aim at the target (Diagram 37).

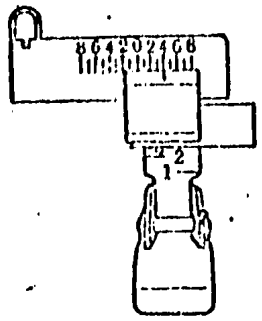


Diagram 37. Windage Correction

2. Correction for oblique winds

The oblique wind speed should be converted to a cross wind correction value, that is, the wind speed should be multiplied by the decimal equivalent of the angle created by the line of fire and the direction of the wind (30 degrees 0.5, 45 degrees 0.7, 60 degrees 0.9). For instance, when the wind speed is 4 m/s, and the line of fire makes a 45 degree angle with the wind direction, then 4 m/s x 0.7= 3 m/s. This correction value is positioned on the side of the scale from which the wind is blowing.

Model 56 Rocket Launcher

Make the correction toward the direction from which the wind blows. At a range of 100 meters, the effect of weak and light winds is small, and normally there is no need to make corrections; in a strong wind, the aim point can be corrected about 50 centimeters toward the direction from which the wind blows.

In correcting the aim point, the calculations should be made from the center of the target.

VI. Selection of a Firing Position

Selection of a firing position should be made in accordance with the principle of "hide the body and enhance the firepower," and should be determined by the enemy's position, the terrain, and the mission commanded. Normally firing positions are selected:

a. On the flank of areas and roads where enemy tanks and armored vehicles could easily pass, where good fields of vision and fire exist.

b. Where camouflage and mobility are convenient; isolated

obviously artificial features of terrain should be avoided.

c. There should be no grass or shrubs within an area of about 20 centimeters on both sides of the muzzle of the launcher nor along the rocket's flight path; the muzzle of the launcher should not be less than 20 centimeters from the ground (Diagram 38), so that the tail fins of the rocket can deploy after launch.

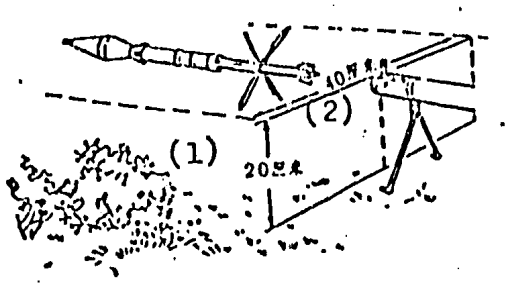


Diagram 38. Flight of the Rocket

Key: 1. 20 centimeters
2. 40 centimeters

The area 30 meters to the rear and within an angle of 40 degrees to either side of the rear of the launcher is a danger area; within this area there should be no personnel, ammunition or flammable material.

When the rocket is fired, one becomes an easy target, so after firing, one should change positions as soon as possible. During a battle, one should not only chose a primary, but also several secondary firing positions.

FIRING METHODS UNDER DIFFERENT CONDITIONS AND TOWARD VARIOUS TARGETS

In order that we might meet and conform with the requirements of actual combat, and, on the basis of mastering firing procedures, we should, in accordance with Chairman Mao's instruction to "use different methods to solve different contradictions," study firing methods used under different conditions and against various targets so as to improve our firing skills.

I. Firing at Moving Targets

The special characteristics of moving targets are their distance, direction and constantly changing speeds. The rocket gunner should take the appropriate opportunity, determine the lead, select the sight graduation and aiming point and then proceed to fire.

A. Calculating Lead

Model 69 Rocket Launcher

Calculating lead for a moving target when there is no wind: First determine the distance and the speed of the target. Then, on the basis of its direction of movement, use the corresponding point of intersection on either the left or right side of the reticle in the sight and aim at the target. If the target is at a distance of 300 meters and moving from left to right, align the target on "2" while maintaining the horizontal line of the speed scale (Diagram 39). At the same time observe how many graduations the target moves in a second. If it moves six graduations, then the speed is 6 m/s.

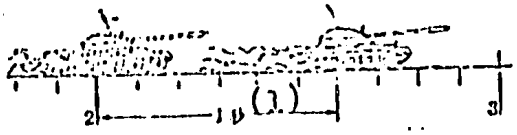


Diagram 39. Speed

Key: 1. One second

When the optical sights are used, align the point in the reticle where the horizontal line indicated by the number "3" intersects with grid mark No. 6 on the [target] speed/wind [speed] scale on the left side of the zero line with the center of the target and fire (Diagram 40). When the open sights are used, move the vernier to the "3" on the rear sight range amplitude scale, place the index

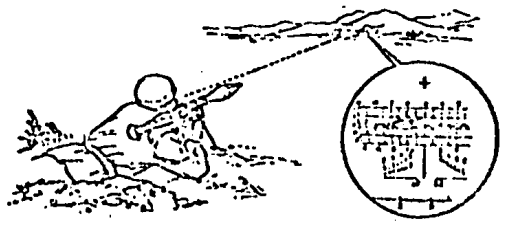


Diagram 40. Range and Lead Setting

of the vernier on grid mark No. 6 on the left side of the null line on the [target] speed/wind [speed] scale, aim at the center of the target and fire when ready.

Calculating the lead for a moving target when there is a wind: First determine the range and the speed of the target and the velocity of the wind, then make corrections. If the direction of the crosswind and the moving target are the same, then the speed of the wind and the

moving target are added together. For example, if the target is at a distance of 200 meters and moving from right to left at a speed of 2 m/sec and the wind is blowing from right to left at 4 m/s, then 2 m/s + 4 m/s = 6 m/s. The range setting on the sight graduation is "2" and the azimuth setting is the "6" on the right side of the zero line on the [target] speed/wind [speed] scale. When a cross wind and the target are moving in opposite directions, the velocity of the wind is subtracted from the speed of the moving target (or if the velocity of the wind is greater, then the speed of the moving target is substracted from the velocity of the wind). The azimuth setting is determined by the direction of the greater force [wind or target]. A wind blowing at an oblique angle should be converted into a cross wind value.

In order not to lose the opportunity to destroy enemy tanks and armored vehicles during a battle, when the speed of the moving target is comparatively slow, the velocity of the wind is comparatively low and the target is within a range of 100 meters, you can go directly to "0" on the zero line, aim at the target and fire.

Model 56 Rocket Launcher

The lead is equal to the speed of the moving target (m/s) multiplied by the time (in seconds) it takes the rocket to reach the target. See the chart below for leads when firing at a moving target in a crosswind.

提前量 (3)	距离 (米) (5)	50	100	150
坦克运动速度 (1)	火箭弹飞行时间 (秒) (4)	0.6	1.2	1.8
3.3米/秒 (6)	(7)米	1.98	3.96	5.94
	(8)车体	$\frac{1}{3}$	$\frac{2}{3}$	1
5米/秒 (9)	(10)米	3	6	9
	(11)车体	$\frac{1}{2}$	1	$1\frac{1}{2}$

Key:
1. Speed of tank
2. Lead measurements
3. Lead
4. Rocket flight time (seconds)
5. Distance (meters)
6. & 9. m/s
7. & 10. Meter
8. & 11. Length of vehicle

B. Firing Opportunities

During battle, rocket gunners must foster our army's tradition of close fighting to destroy the enemy and seize the moment when the exposed

area of the enemy's tanks and armored vehicles which are moving in a lateral or oblique direction is the greatest. They should move when the speed [of the vehicles] is decreasing, separate from the infantry fighting force at the opportune moment, and proceed to fire in a decisive and lively manner.

C. Method of Firing

1. When firing at a target moving in a lateral or oblique direction, you should adopt either the method of waiting for the opportune moment or the method of tracking.

Firing at the opportune moment: When the target is moving in a forward direction, select several opportune points and using predetermined leads take aim. When the target enters the opportune point, steadily and decisively squeeze the trigger. If you miss the first opportunity, you should aim at the next point and fire in the manner described above.

Tracking: Using predetermined leads, follow in a steady manner the moving target with the barrel of the rocket launcher. Maintain the correct aim and fire according to prescribed procedures.

There are situations in which the two methods can be combined.

2. When the target is moving directly toward you, lower the aiming point and when the target is fleeing from you, raise the aiming point.

II. Night Firing

"Close quarter fighting and night operations are the glorious traditions of our army. In the past we have used these types of methods to annihilate the enemy." In night firing your vision is limited, and observation, measuring distances and aiming are all more difficult. Because of this you should strengthen training in night firing so that your skills in night firing are improved.

A. Using the Infrared Optical Sight When Firing

When firing, the storage battery is hung on the right side of the body. Connect the power source, take off the light shield (Diagram 41) and observe through the lens whether or not there is enemy infrared reconnaissance equipment (luminous body). If there is none, you can then turn on the infrared light and search for the target. After finding the target, make the necessary range and azimuth corrections. Keeping the horizontal mark within the sight level, align the target with the index and fire.

Diagram 41. Using the Infrared Optical Sight When Firing

B. Firing at a Flashing Target

1. Firing with an Optical Sight: Turn on the illumination light and using a predetermined grid aim at the light point and fire. In the winter the dry cell battery should be stored in the illumination device for winter use and affixed to the lapel of the garment in order to insure a normal supply of electricity.

2. Firing with the Open Sights: First point the barrel generally toward the point of light. Then use the front sight cover (the slot on the Model 56) to line up the point of light. Next raise the muzzle of the gun a little to find the front sight [bead], then lower the muzzle slightly while [aiming] at the point of light to find the slot. Next move the barrel to check the alignment of the sight, take correct aim and fire steadily and decisively.

If the point of light is lost after aiming, you should maintain your original stance and fire rapidly.

C. Firing in Moonlight

When firing in moonlight, you can aim directly and fire at a target which can be clearly seen. For a target which can only be vaguely seen, point the barrel in the approximate direction of the target and fire. You can also utilize a comparatively well-illuminated background near the target to obtain the correct relatioship between the front sight and the slot. Then move the barrel toward the target and fire.

III. Firing While Wearing A Gas Mask

When firing while wearing a gas mask, you should put on the gas mask according to instructions and, as much as possible, keep the gas mask lens of the eye which is doing the aiming perpendicular to the line of sight. Before wearing the mask, you may add an antidim lens or

apply antidim ointment on the lens.

APPENDIX

I. Conditions for Live Firing

(1) 区分	(2) 第一次射击	(3) 第二次射击	(4) 第三次射击
(5) 目的	检验射手对不动目标射击的技能。(6)	检验射手对运动目标射击的技能。(7)	检验射手在夜间对闪光目标射击的技能。(8)
(9) 目标	正面坦克靶或地堡靶 (10)	侧面坦克靶，在20—30米长径上，以3米/秒的速度成横(斜)方向运动。(11)	地堡靶(以2.5伏特电珠闪光显示) (12)
(14) 距离 六九式 (13)	300米(15)	200米(16)	100米 (17)
(18) 五六式	100米(19)	100米(20)	50—100米 (21)
(22) 姿势	卧姿有依托(23)	跪姿无依托(24)	自选 (25)
(26) 弹数	3发(每次射击发射1发)；6发(每次射击发射2发)。(27)		
(28) 成绩评定	三次射击完毕后，综合评定成绩：发射3发时，命中2发以上为优良，命中1发为合格。发射6发时，命中4发以上为优等，命中3发为良好，命中2发为及格。 (29)		

Key:
1. Categories
2. First firing
3. Second firing
4. Third firing
5. Purpose
6. Examine the gunner's skill while firing at a stationary target
7. Examine the gunner's skill while firing at a moving target
8. Examine the gunner's skill while firing at a flashing target during nighttime
9. Target
10. A target which is either a tank viewed head on or a fortified position
11. A target of a tank which is viewed from the side: The tank is traveling at a speed of 3 m/s along a 20 to 30 meter-long path and moving in either a lateral or oblique direction.

12. A target which is a fortified position (use a 2.5 volt light bulb for the flashing display)
13. Distance
14. Model 69
15. 300 meters
16. 200 meters
17. 100 meters
18. Model 56
19. 100 meters
20. 100 meters
21. 50 to 100 meters
22. Position
23. Prone position with support
24. Kneeling position without support
25. Gunner's own choice
26. Number of shots
27. 3 rounds (with each firing, fire one round)
    6 rounds (with each firing, fire two rounds)
28. Rating the results
29. Upon the completion of three firings, comprehensively evaluate the results:

When three rounds are fired, if two or more rounds hit the target, the rating is excellent. If there is only one hit, it is satisfactory. When six rounds are fired, if four or more rounds hit the target, the rating is excellent; three hits is a good rating; two hits is a satisfactory rating.

II. Relevant Regulations and Safety Measures For Carrying Out Live Firing

A. Relevant Regulations for Carrying Out Live Firing

1. In general during live firing, the unit's own weapon should be used. If, however, there are special conditions under which the unit's own weapon can not be used, it is necessary to have the approval of the camp commander [to use another unit's weapons].

2. When a dud is discovered during firing, it should immediately be reported to the commanding officer. Discard it according to instructions and continue firing.

3. During live firing, a hit to the side of the target is considered a hit.

B. The Position and Responsibilities of Organizations and Important Persons on the Firing Range

1. The commander of the firing range is responsible for organizing and setting up the range, is in charge of logistics and sees

to it that all personnel observe each regulation and safety procedure of the firing range.

2. The Security Group is responsible for the security and observation tasks for the entire range. Before firing they should make a thorough search and ensure that no person or livestock is inside the secure area; during firing they will strictly prohibit people or livestock from entering the secure area. Security personnel should carry a security flag and upon discovering danger they should immediately set out a signal and report to the commanding officer.

3. Signal (observation) personnel, in accordance with the directives of the commanding officer of the firing range, are to set out every type of signal. They are to observe seriously the safety conditions of the firing range and upon discovering danger they are to report it immediately.

C. Safety Measures for the Firing Range

1. The firing range must have a reliable target backstop. In addition, facilities which ensure safe firing should be constructed.

2. The firing range must [clearly] define the firing line and the firing positions so that no unauthorized person is allowed to cross over the firing line.

3. Before [actual] firing, [a course in] safety education which clearly sets forth each type of signal should be given to the detachment. Such signals as "range safety features now in effect," "commence firing," "cease firing" and "exercise ended" should be given.

4. Before firing you should thoroughly examine the weapons and ammunition. If a protusion in the percussion cap or defective ammunition is discovered, their use is to be strictly prohibited. If, during firing, a dud is discovered, then unrestrained movement is strictly prohibited. After firing, designate a specialist to destroy it.

III. Models of Targets [Used] (Diagram 42)

(Unit of measurement for the target is centimeter.)

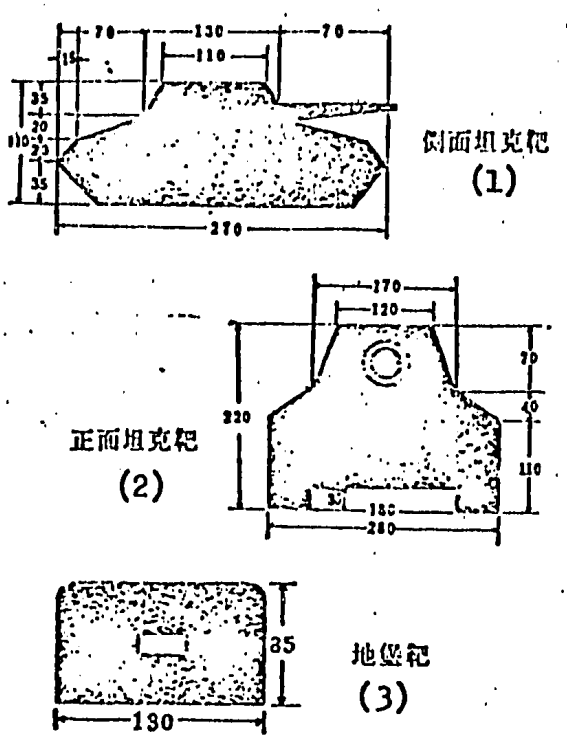


Diagram 42. Models of Targets [Used]

Key:
1. Side view of tank target
2. Frontal view of tank target
3. Target which is a fortified position

IV. Important Data Chart for Rocket Launchers and Rockets

(1)	诸元	六九式(2)	五六式	(3)
(4)	口径	40毫米 (5)	40毫米	(6)
(7)	火箭筒全长	910毫米 (8)	950毫米	(9)
(10)	火箭筒全重	5.7公斤(包括光学瞄准镜) (11)	2.75公斤	(12)
(13)	火箭弹全长	930毫米 (14)	670毫米	(15)
(16)	火箭弹全重	2.3公斤 (17)	1.84公斤	(18)
(19)	火箭弹外径	85毫米 (20)	80毫米	(21)
(22)	初速	120米/秒 (23)	84米/秒	(24)
(25)	战斗射速	4—6发/分 (26)	4—6发/分	(27)
(28)	瞄准基线长	310毫米 (29)	230毫米	(30)
(31)	准星宽	2毫米 (32)	3毫米	(33)
(34)	红外瞄准镜	2.8公斤 (35)		
(36)	弹药背具		8.25公斤(带三发火箭弹和附品)	(37)
(38)	喷火区角度	80度 (39)	60度	(40)

Key:
1. Data
2. Model 69
3. Model 56
4. Diameter of muzzle [bore?]
5. 40 mm
6. 40 mm
7. Entire length of rocket launcher
8. 910 mm
9. 950 mm
10. Total weight of the rocket launcher
11. 5.7 kilo (including the optical sight)
12. 2.75 kilo
13. Total length of rocket
14. 930 mm
15. 670 mm
16. Total weight of rocket
17. 2.3 kilo
18. 1.84 kilo
19. Outside diameter of rocket

20. 85 mm
21. 80 mm
22. Initial speed
23. 120 m/s
24. 84 m/s
25. Rate of fire in battle
26. 4-6 rounds per minute
27. 4-6 rounds per minute
28. Length of base line of sight
29. 310 mm
30. 230 mm
31. Width of front sight
32. 2 mm
33. 3 mm
34. Infrared optical sight
35. 2.8 kilo
36. Ammunition backpack
37. 8.25 kilo (carries three rounds of rockets and attachments)
38. Angle of backblast area
39. 80 degrees
40. 60 degrees

V. Bore Sighting for Optical Sights (Open Sights)

A. Preparation Before Calibration

1. Tighten the crosshairs in the four notches on the forward detector [bore sight plug] and insert it into the bore (so that the two score marks are aligned with the positioning slot). On the Model 69 rocket launcher a rear detector [rear bore sight plug] is also attached.

2. Place the rocket launcher on the launcher rest, attach the optical sight (fold up the open sights) and turn the temperature adjustment knob to + 20° [centigrade] (on the infrared optical sight turn the elevation knob to "2" and the azimuth knob to "0"); set the rear sight at "3" and the deflection scale at "0"

3. Place a calibration target at least 30 meters directly in front of the optical sight (rear sight) and perpendicular to the line of sight.

B. Methods for Boresighting

1. Optical Sight: While sighting through the peephole in the detector at the rear of the rocket launcher, move the rocket launcher so that the crosshairs in the detector and the large cross on the calibration target coincide (Diagram 43). At this time the crosshairs in the sight should coincide with the small cross on the target. If they do not, without moving the rocket launcher, open the protective

cover over the azimuth adjusting screw and use a screwdriver to turn the adjustment screw so that the vertical centerlines coincide; loosen the screw at the bottom of temperature adjusting knob and without moving the scale ring use the screwdriver to adjust the knob so that the "0" horizontal lines coincide. After the adjustments have been made, tighten the screw. Repeat the above method to check your adjustments.

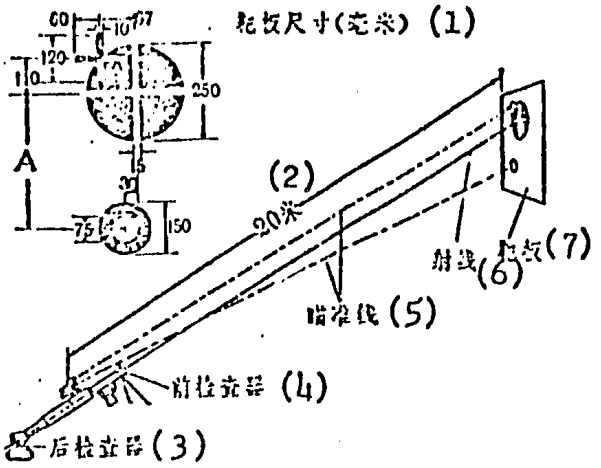


Diagram 43. Boresighting with the Optical Sight (Open Sight)

Key:
1. Measurements for the target (mm)
2. Meter
3. Rear detector
4. Forward detector
5. Line of sight
6. Line of fire
7. Target

You can also use the aiming point method to make calibrations. The method: Select an independent, obvious point at which to aim and move the rocket launcher so that the point of intersection of the crosshairs of the detector is aimed at the [selected] point. At this time the point of intersection of the crosshairs in the sight should coincide with the selected point. If they do not, you should, without moving the rocket launcher, adjust the crosshairs in the sight to coincide with the selected point. The method of adjustment is the same as above.

2. Infrared Optical Sight: Move the rocket launcher so that the crosshairs of the detector coincide with the large cross on the calibration target (Diagram 44). Turn on the storage battery (Do not turn it on in day light.) Check the index in the sight. It should be in the center of the small circle in the calibration target. If the index is not in the center of the small circle, loosen the screws of the azimuth and elevation knobs without moving the rocket launcher. Then, without moving the scale ring, turn the knobs and adjust the index in the sight so that the correction is made. Tighten the screws.

Repeat the above procedure to check your adjustments.

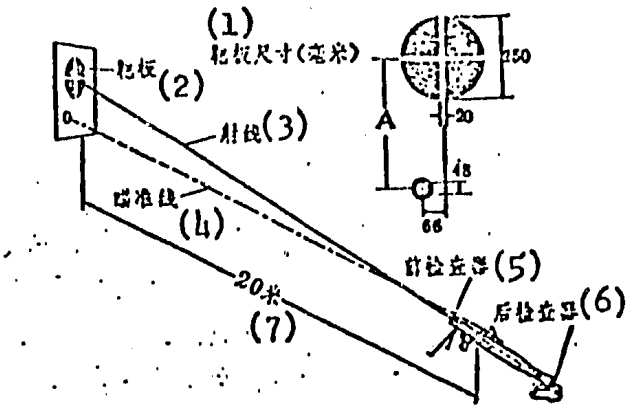


Diagram 44. Boresighting with the Infrared Optical Sight

Key:
1. Measurements for the target (mm)
2. Target
3. Line of firing
4. Line of sight
5. Forward detector
6. Rear detector
7. 20 meters

Specification for the Calibration Target for the Infrared Optical Sight

(1)	温　　度	50°C	35°C	15°C	0°C	−20°C	−40°C
(2)	A值(毫米)	367	395	437	459	501	541

Note: "A" represents the perpendicular distance between the center of the large cross on the calibration target and the center of the small circle on the same target.

Key:
1. Temperature
2. A (mm)

3. Open Sights on the Model 69: While sighting through the peephole in the detector at the rear of the rocket launcher, make the crosshairs of the detector coincide with the large cross on the calibration target. At that time, the line of aim should be directed towards the center of the small circle on the calibration target (see Diagram 43). If it is not, loosen the bolt on the front sight plate

without moving the rocket launcher and adjust the front sight cover to the left (right). Use the curved wrench to adjust the front sight up (down). After corrections have been made, securely tighten the bolt. Repeat the above method to check your adjustment.

When calibrating the open sights, if there is a marked difference between the [present] air temperature and normal [air] temperatures, you should make the calibration in accordance with the calibration target specifications for different air temperatures. Calibration target specifications are given below:

Calibration Target Specifications

(1)	温　　度	50°C	20°C	0°C	−15°C	−40°C
(2)	A 值(毫米)	466.3	559.2	598.6	627.2	673

Note: "A" represents the perpendicular distance between the center of the large cross on the calibration target and the center of the small circle on the same target.

Key: 1. Temperature
2. A (mm)

4. Open Sights on the Model 56: While sighting through the crosshairs peephole of the detector, aim at the inspection target so that the lines of the crosshairs of the detector and the lines of the cross on inspection target coincide. Fix the position of the rocket launcher. Use the peephole for the "100" [meter-range] on the rear sight to aim again at the inspection target. The alignment of the aiming line can not be outside of the inner white circle on the inspection target (Diagram 45). If specifications are not met when the rocket launcher is fired, make the necessary adjustments.

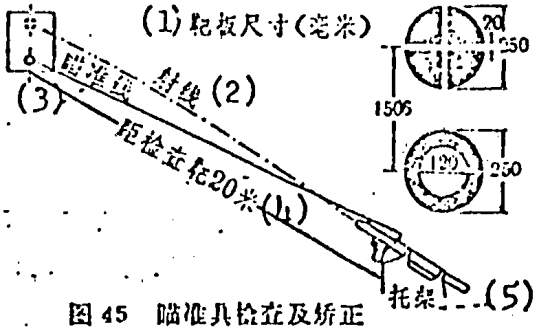


图 45　瞄准具检查及矫正

Diagram 45. Boresighting with Open Sights

Key: 1. Measurements for the target (mm)
2. Line of fire
3. Line of aim
4. 20 meters from the inspection target
5. Brackets

1963 Model 60-mm Mortar

"Close-quarter combat and night combat are part of our glorious traditions. In the past we have used these techniques to annihilate our enemies." The 60-mm mortar is a high-angle infantry firearm and is an effective weapon for wiping out the enemy in close-quarter combat. For this reason, the firing exercises of the 60-mm mortar units must be improved.

We must start with the requirements of actual combat and truly strive to perfect our study and training by strictly observing the needs of training, by fully implementing the principle of linking theory with reality, by proceeding from the simple to the complex, and by placing emphasis on the important points. We must conscientiously summarize our experiences, continue to improve the quality of our training and strive to master the skills connected with firing accurately and rapidly under all sorts of conditions.

BASIC FACTS ABOUT THE WEAPON

Chairman Mao has instructed us: "When you do anything, unless you understand its actual circumstances, its nature and its relations to other things, you will not know the laws governing it, or know how to do it, or be able to do it well." The key to learning the basic facts about a weapon, lies in gaining an understanding of its qualities and capabilities in combat and a familiarity with the names and functions of its principal parts, and this in turn will afford an excellent foundation for using and caring for the weapon.

I. Combat Qualities and Capabilities

The 60-mm mortar is a high-angle infantry firearm. Its fire power enables one to curtail and demolish the enemy's effective strength and firearms, whether they be exposed or hidden, or inside or outside ramparts. The maximum firing range is around 1500 meters. In battle, their rate of fire ranges from 15-20 rpm. These projectiles have an effective antipersonnel radius of 15 meters. Their operation is simple, they are easily transported, and can be kept close to the side of the infantrymen in combat.

II. Names and Functions and Assembly and Dissassembly

A. Names and Functions of the Principal Parts

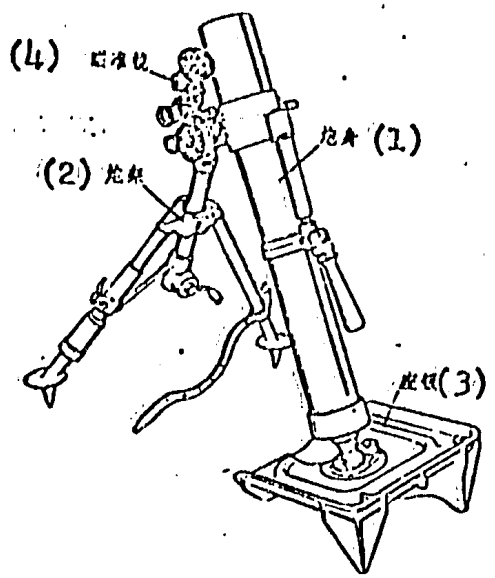


Diagram 1. 60-mm Mortar

Key: 1. Barrel
2. Bipod
3. Baseplate
4. Optical sight

The 60-mm mortar (Diagram 1) consists of a barrel, a bipod, a baseplate and an optical sight, in addition to other accessories and spare parts.

1. The barrel (Diagram 2) consists of mortar tube, a breech and a firing pin. It is used to fire and direct the projectile. The mortar tube is inscribed with a white line for use in rough aiming and in checking the zero position and zero line.

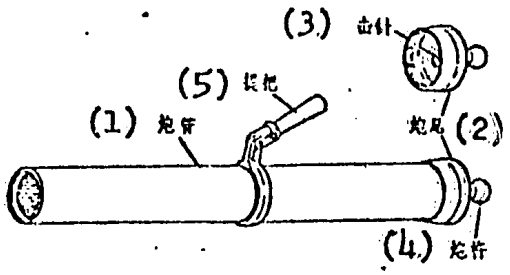


Diagram 2. The Barrel

Key: 1. Mortar tube
2. Breech
3. Firing pin
4. Breech ball
5. Handle

2. The bipod (Diagram 3) consists of a barrel collar, a bracket, a shock absorber, a traversing mechanism, an elevating mechanism, a leveling mechanism and legs (the lower part of which consist of footplates and points). It supports the barrel and provides for the mortar's angle of fire and azimuth.

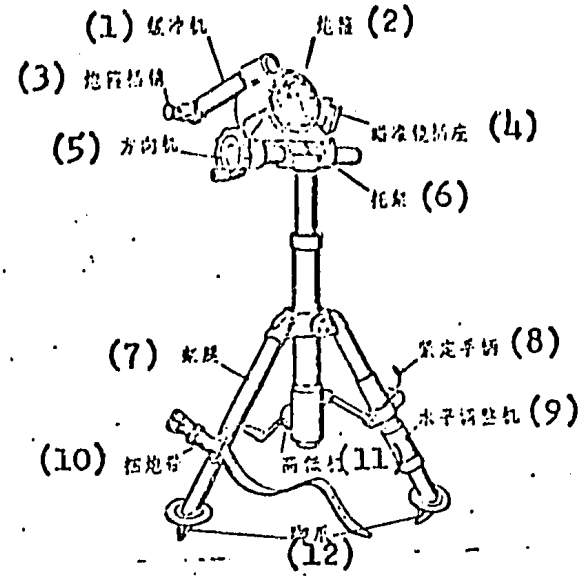


Diagram 3. The Bipod

Key:
1. Shock absorber
2. Barrel collar
3. Clamp bolt
4. Sight seat
5. Traversing mechanism
6. Bracket
7. Bipod leg
8. Locking lever
9. Leveling mechanism
10. Bipod strap
11. Elevating mechanism
12. Points

The shock absorber consists of a shock absorber guide, a plug and so forth. It decreases the shock between the mortar and mount when firing.

The traversing mechanism consists of a handwheel, a traversing screwnut and a spindle tube. It operates in conjunction with the sight in facilitating azimuth sighting.

The leveling mechanism consists of a locking lever, a locking collar, a connecting rod, a slide tube and an adjustment screw. It is used in leveling the traversing mechanism.

3. The baseplate (Diagram 4) consists of a principal plate, a socket, a locking screw and ribs and braces. It is designed to absorb the recoiling of the barrel when fired.

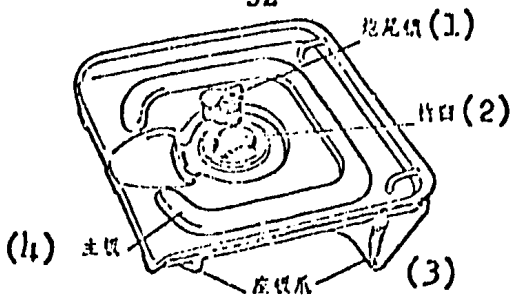


Diagram 4. The Baseplate

Key:
1. Locking screw
2. Socket
3. Ribs and Braces
4. Principal plate

4. The optical sight (Diagram 5) consists of a sight head and body. It is used in conjunction with the traversing and elevating mechanisms in achieving accuracy in aiming.

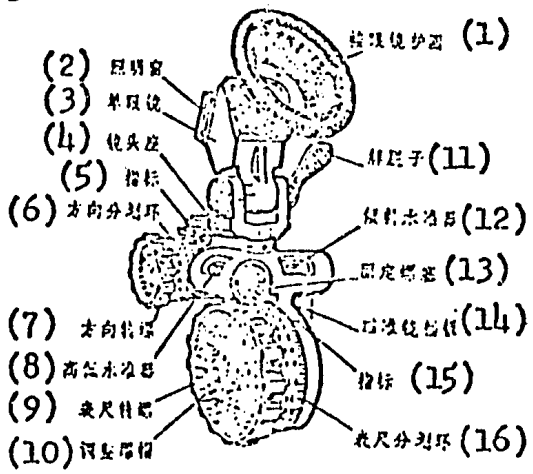


Diagram 5. The Optical Sight

Key:
1. Eyepiece
2. Lighting aperture
3. Monacle
4. Sight head seat
5. Index
6. Deflection scale ring
7. Deflection knob
8. Longitudinal level
9. Elevation scale knob
10. Adjusting nut
11. Release knob
12. Cross level
13. Setscrew
14. Optical sight bracket
15. Index
16. Elevation scale ring

The sight head consists of a monacle, an eyepiece, an aperture and a release knob. It is used in sighting and plotting. The monacle is inscribed with a cross-shaped figure which is used in aiming at a target. The release knob is used to control the pitch of the monacle.

The sight body consists of elevation and deflection devices and a bracket.

The elevation devices consists of a longitudinal level, an index, an elevation scale knob and an elevation scale ring. The elevation scale ring is engraved with the numbers 3-8 to 10-0, representing 3-80 and 10-00, respectively. The space between two long lines represents 0-10, whereas that between long and short ones represents 0-05. Turning the elevation scale knob forward will yield a higher range scale; turning it backward will yield a lower range scale. Setting the elevation scale at 10-0 will correspond to firing at roughly a 45-degree angle.

The deflection devices consist of a cross level, an index, a deflection knob and a deflection scale ring. The deflection scale ring has been engraved with a "+" and a "-" sign, in addition to 20 long lines numbered 0-19. That numbered 1 represents 0-10, that numbered 2 represents 0-20, and so on. The spaces between the long and short lines represents 0-05. When making a correction to the right, the deflection knob should be turned forward toward the "+" mark; when making a correction to the left, it should be turned backward toward the "-" mark.

5. Accessories and Spare Parts and the Quadrant

The accessories (Diagram 6) are used to assist [in determining] the line of fire, for assembling and disassembling the mortar, and for its care and repair.

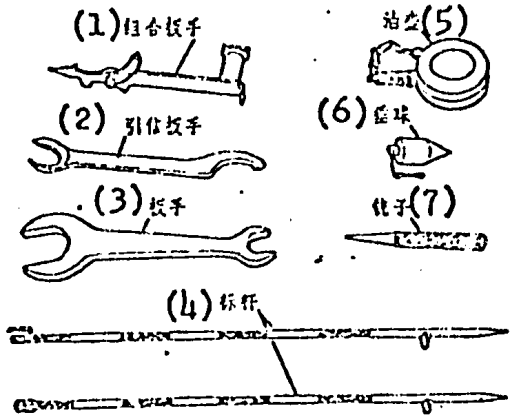


Diagram 6. Accessories

Key:
1. Combination wrench
2. Fuze wrench
3. Wrench
4. Aiming stakes
5. Oil can
6. Plumb
7. Center punch

The spare parts include large coil compression springs, small coil compression springs, firing pins, seals and pins.

The quadrant (Diagram 7) consists of a frame, a scale ring, a level seat, a level, a set screw and screws. It is used in determining the mortar's angle of fire.

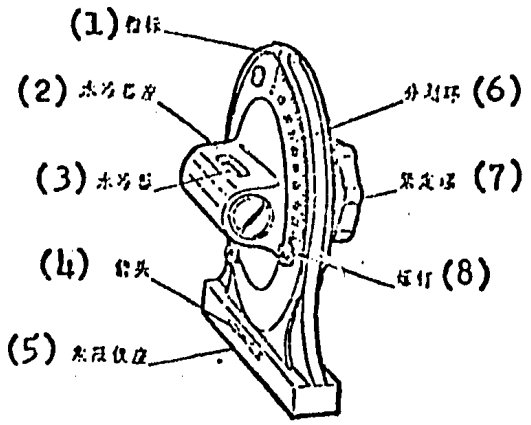


Diagram 7. The Quadrant

Key:
1. Index
2. Level seat
3. Level
4. Line of fire arrow
5. Quadrant seat
6. Scale ring
7. Set screw
8. Screw

B. Disassembly and Assembly

1. Disassembly: Loosen the locking screw and remove the baseplate. Loosen the clamp bolt and remove the barrel, pulling it downward and moving it in a counterclockwise fashion. When necessary, use a combination wrench to remove the firing pin, turning it counterclockwise.

2. Assembly: Follow the procedure above but in reverse.

III. The Names and Functions of the Parts of the Cartridge

The cartridge (Diagram 8) is composed of a body, a tail, a propellant and a fuze. It is used to cripple the enemy's active strength and destroy their weapons.

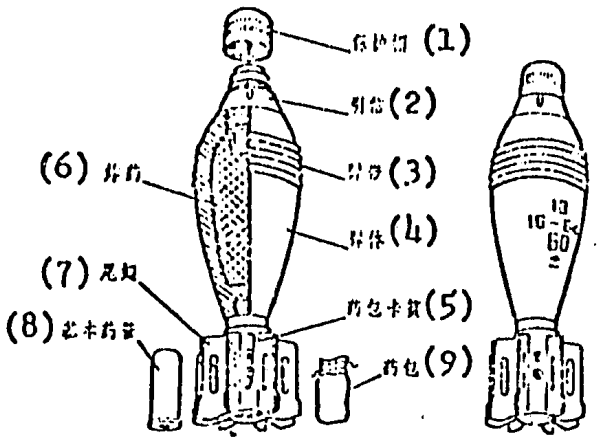


Diagram 8. The Cartridge

Key:
1. Protective cap
2. Fuze
3. Annular groves
4. Body
5. Increment holder
6. Bursting charge
7. Stabilizing fins
8. Ignition cartridge
9. Increment

1. The body is loaded with a bursting charge which causes fragmentation of the body after exploding, causing casualties among the enemy. The body has a fuze receptacle and annular rings. Cartridge weight is indicated on the body: "+" denotes a heavy cartridge; "-" denotes a light cartridge; "±" denotes a standard cartridge.

2. The tail is composed of an ignition charge receptacle, stabilizing fins and increment holders. Its function is to insure flight stability and allow for emplacement of the ignition cartridge and increments.

3. The propelling charge is composed of an ignition charge and increments. Ignition causes a backblast of gas which in turn propels the cartridge through the bore.

4. Fuzes: The most common fuzes are types 100-3, M-5, pu-lang-te [1580 6745 1795] and 100. They are used to ignite the body.

The firing pin in the 100-3 type fuze (Diagram 9) is bonded to an aluminum cap. The aluminum cap is placed inside the casing. A breaker pin bonds together the aluminum cap, casing and

fuze body and prevents the firing pin from moving about. The backplate prevents the percussion cap from moving forward, so a definite distance is maintained between the firing pin and the percussion cap, which in turn prevents the firing pin from coming into contact with the percussion cap, thereby acting as a safety device when the cartridge is at rest, fired or in flight. At the moment of impact, the cover plate is crushed. Exterior force breaks the aluminum cap and breaker pin. At this moment, the spring is compressed and the firing pin strikes the percussion cap, causing the booster pellet to explode, in turn causing the explosion of the body.

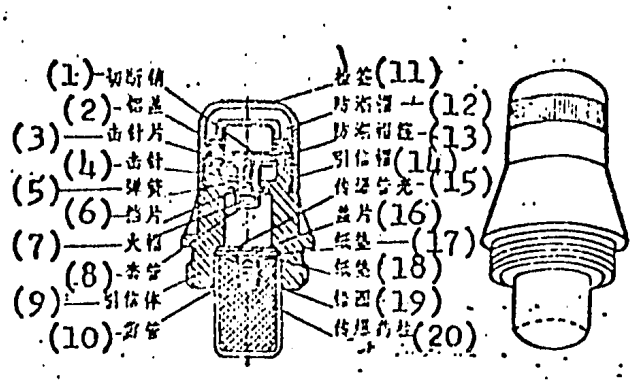


Diagram 9. The 100-3 Fuze

Key:
1. Breaker pin
2. Aluminum cap
3. Striker plate
4. Firing pin
5. Spring
6. Backplate
7. Percussion cap
8. Casing
9. Fuze body
10. Detonator [delay charge]
11. Inspection sticker
12. Moisture-proofing cap
13. Collar for moisture-proofing cap
14. Fuze cap
15. Booster cup
16. Cover plate
17. Paper gasket
18. Paper gasket
19. Lead gasket
20. Booster pellet

IV. Care and Maintenance of the Weapon

"Our duty is to serve the people." Weapon care is an important responsibility of revolutionary fighters and a step toward constant war preparedness, as well as an effective preventive against breakdowns. For this reason, we should thoroughly inspect them and keep them thoroughly clean. We should not knock them about, or damage them, or lose them.

A. Weapon Care

1. Weapons and ammunition should be stored in a safe, dry and

well ventilated place. During heavy fogs and rainy seasons or in humid areas and mines, they especially should be protected from becoming damp. They should be kept out of the sunlight and away from fires. Normally, the barrel cap should be kept on the mortar. The elevating mechanism should be cranked to its lowest position and the traversing mechanism placed in the central position.

The optical sight should be stored in its case, so as to prevent its being damaged. Normally it should be placed on the bipod. When suspended, it should be kept away from walls.

2. A mortar should be oiled frequently, especially after use, so as to prevent rust and corrosion. Immediately after firing live ammunition, gun oil should be applied to the walls of the bore, so as to dissolve remnants of gunpowder left in the barrel and to facilitate cleaning. When cleaning, special care should be taken in wiping the breech clean. Either a soap or alkaline solution may be used when cleaning the bore and breech, followed by a rinsing with clear water and a coating of oil. Every three or four days thereafter, the bore should be wiped down.

Use either a piece of fine cloth or flannel when cleaning the optical sight, but do not use oil.

After having come into contact with toxic or radioactive substances, the mortar should be cleansed and wiped down at the first opportunity.

3. The weapon should be inspected often or at designated times. When inspecting it, the bore should first be inspected for cleaniness. Check to see whether the firing pin is any good and whether the barrel and breech fit together properly. After this, check to see whether the shock absorber, traversing mechanism, elevating mechanism and leveling mechanism are in good order. The methods are as follows: pull the shock absorber guide upward; when released, it should fall steadily and smoothly back to its original position. When turning the traversing and elevating mechanisms, they should operate smoothly and with ease. Secure the locking lever; when turning the leveling mechanism, the slide tube should move up and down with ease, insuring the levelness of the barrel. If damaged, a weapon should be sent to the arms repair shop for inspection and repairs. At the same time, the accessories and spare parts should also be inspected so as to insure that they are in good order and to prevent their loss.

B. Weapon Repairs [Trouble-shooting]

Failure to fire is one of the most commonly observed problems and is often attributable to an ineffective percussion primer, a worn or capped firing pin or an unclean bore. The methods for

solving such problems are as follows: shake the barrel several times so as to get it to fire. If it still does not fire, then remove the cartridge in accordance with the following procedure: gunner No. 1 grasps the bipod leg with the left hand and the upper end of the elevating mechanism with the right. Gunner No. 2 turns the elevating mechanism down to its lowest point and loosens the spherical projection locking screw, grasping the spherical projection with the left hand and the muzzle with the right. With the thumb and index finger forming a circle and placed at the muzzle, he then slowly lifts the lower end of the barrel upward and slides out the cartridge. Before the cartridge slides out, by no means should the breech be permitted to move downward. Preventative measures: prior to firing, inspect and wipe down the bore and cartridge; check the firing pin; do not permit the percussion primers and increments to become damp.

SIMPLIFIED PRINCIPLES OF GUNNERY

"Theory is based on practice and in turn serves practice." The study of the simplified principles of gunnery is of great significance for a correct grasp of firing techniques and for increasing the rate of hits on target. For these reasons, one should study conscientiously, and apply these principles in practice.

I. Trajectory

A. Names of the Parts of the Trajectory

The line which the mortar shell travels in flight after it leaves the muzzle of the mortar is called the trajectory. The names of the various parts of the trajectory are as shown below (Diagram 10):

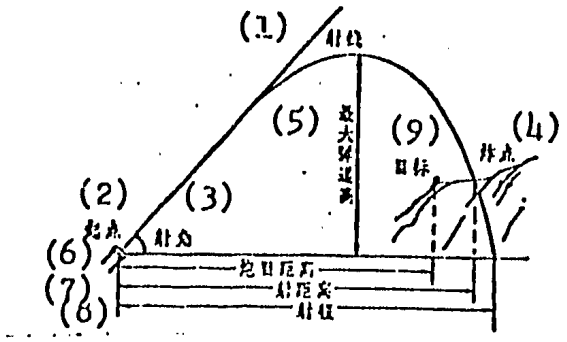


Diagram 10. Parts of the Trajectory

Key:
1. Line of fire
2. Initial point
3. Elevation
4. Impact point
5. Maximum height of trajectory
6. Mortar to target range
7. Firing distance
8. Firing range
9. Target

Line of Fire: After the mortar is aimed, the extension of the axis of the mortar barrel.

Initial point: The point at the center of the end of the projectile at the moment when the projectile leaves the muzzle.

Muzzle plane: The horizontal plane which bisects the initial point.

Elevation: The angle created by the muzzle plane and the line of fire.

Impact point: The point where the projectile [hits and] explodes.

Maximum height of trajectory: The highest point on the trajectory measured perpendicularly from the muzzle plane.

Mortar to target range: The horizontal distance from the initial point to the target.

Firing distance: The horizontal distance from the initial point to the impact point.

Firing range: The horizontal distance from the initial point to the point of fall.

Muzzle velocity: The speed of the projectile as it passes the initial point.

B. The Relationship between Muzzle Velocity, Elevation and Firing Range

Change in the propelling charges and changes in the elevation must necessarily effect the muzzle velocity and the degree of curve in the trajectory and cause the projectile to fall at different distances. With identical propelling charges, the greater the elevation, the more curved the trajectory, the nearer the firing range; the less the elevation (no greater than 45 degrees), the lower the trajectory, the farther the firing range, with identical elevations, the greater the propelling charges, the greater the muzzle velocity, the greater the firing range; the smaller the propelling charges, the slower the muzzle velocity, the closer the firing range. By simultaneously changing the elevation and the propelling charges, one can effect trajectories of different altitudes for the same distance reached.

II. Dispersion

A. What is Dispersion of Fire?

When a single mortar, using a single elevation and azimuth setting, utilizing identical ammunition and propelling charges, operated by a single gunner using a single operating sequence, successively fires many rounds of ammunition, the shells cannot all land at the same spot, rather, they will land within a given area: this phenomenon is called dispersion of fire.

B. Causes of Dispersion of Fire

1. The mortar: The effects of mortar temperature, cleanliness of the barrel, play between mortar bipod and sighting instruments.

2. The ammunition: The effect of the weight and shape of the projectile, the weight of the propelling charge, its quality, its temperature and its moisture content.

3. Operational methods: The effect of the accuracy of aim, the method of loading the cartridge, the depth or shallowness of ignition cartridge loading and differences in the position of the propellant increment loaded.

4. Weather: The effect of wind direction, wind speed and changes in ambient temperature.

C. Methods for Contracting the Dispersion Area

1. Strengthen the care and maintenance of the mortar: maintain it in good working order.

2. When firing successive rounds at one target. use ammunition with identical markings, and as much as possible, use the smaller sizes of propelling charges.

3. Practice diligently, be demanding of yourself, improve your operational techniques to the point that aiming, loading, insertion of the ignition cartridge, and the positioning of the propelling charges are always identical.

4. Learn well the requirements of different weather conditions, so that any time you can correct for the effects of wind and temperature.

III. The Effect of External Conditions on Firing and Their Correction

A. The Effect of Wind on the Projectile and Its Correction

1. Determination of Wind Direction and Strength

a. Wind directions are divided into cross winds, oblique winds and longitudinal winds (tail and head winds).

b. Wind strength is divided into weak, light and strong.

c. Determination of wind strength, wind speed.

Weak wind: wind speed 2-3 m/s, equivalent to a force 2 wind. Effects: slight movement of flags, grass, and small tree branches, smoke drifts slowly.

Light wind: wind speed 4-7 m/s, equivalent of a force 3-4 wind. Effects: flags open and wave, grass moves unceasingly, small branches of trees wave, smokes drift at an acute angle.

Strong wind: wind speed 8-12 m/s, equivalent to a force 5-6 wind. Effects: flags extend straight out and snap in the wind, grass is blown down, large tree branches move, smoke is blown horizontally.

2. The Effect of Wind on the Projectile and Correction

a. A cross wind can cause a directional deviation in

the flight of a projectile. When the wind is blowing from right to left, the projectile will deviate to the left, and the correction should be made to the right. When the wind is blowing from left to right, the projectile will deviate to the right, and the correction should be made to the left.

$$\text{The amount of correction} = \frac{\text{Prescribed Correction Value}}{10} \times \text{Crosswind speed}$$

Example: When firing at an enemy recoiless rifle 500 meters away, with No 1 propelling charge and the wind blowing from right to left, at a speed of 3m/s, the correction value is determined as follows:

Consult the calculation table (Appendix V), the cross-wind speed column. The prescribed correction [for cross wind speed of] 10 m/s is 0-29.

The amount of correction = $\frac{29}{10}$ x 3 = 0-09, to the right, 0-09.

b. Longitudinal winds (tail, head winds) can cause a deviation in the projectile's range; for head winds, increase the deflection scale setting; for tailwinds, decrease the deflection scale setting.

The correction value= $\frac{\text{Prescribed correction}}{10}$ x Longitudinal wind speed.

Example: When firing at an enemy gun 300 meters away, using No "0" propelling charge, deflection scale 5-98, with a headwind speed 7 m/s, the correction is determined as follows:

Consult the calculation table longitudinal wind column. The prescribed correction for 10 m/s is 0-17.

Correction value + $\frac{17}{10}$ x 7 = 0-12, deflection scale setting 0-12.

Deflection scale = 5-98 + 0-12 = 6-10.

c. An oblique wind can cause simultaneous deflection in the projectile's distance and direction, thus the deflection scale and the azimuth settings must be corrected simultaneously.

When making the correction, one must multiply the actual correction value for the longitudinal or cross wind one had derived by a decimal equivalent (30 degrees 0.5, 45 degrees 0.7, 60 degrees 0.9).

Example: When firing at an enemy observation post 700 meters away, using No 2 propelling charges, deflection scale 6-39, with the wind blowing from the right front toward you at a speed of 8 m/s, the correction value is determined as follows:

Oblique wind deflection correction value = $\frac{22}{10}$ x 8 x 0.7 = 0-12.

Deflection = 6-39 + 0-12 = 6-51. Oblique wind direction correction.

Oblique wind direction correction value = $\frac{31}{10}$ x 8 x 0.7 = 0-17. To the right, 0-17.

B. The Effect of Ambient Temperature on the Projectile and Correction

When there is a change in the ambient temperature, there is also a concomitant change in air density which will have an effect on the speed of a projectile's flight; the greater the difference in temperature and the greater the firing range, the greater the effect on the flight of the projectile. When the temperature is low, the air is dense and exerts a greater resistance on the projectile's flight, and thus the projectile falls short, and so the deflection scale must be advanced; when the temperature is high, the air is thin, and offers little resistance to the projectile, and thus it will overshoot, and thus the deflection scale must be reduced. Consult the correction tables (Appendix V) for the ambient temperature correction column.

IV. Mils

1. Mils

Mil is a commonly used term designating a measurement of angle. When a circle is divided into 6,000 equal parts, the central angle of each arc is the equivalent angle of one mil.

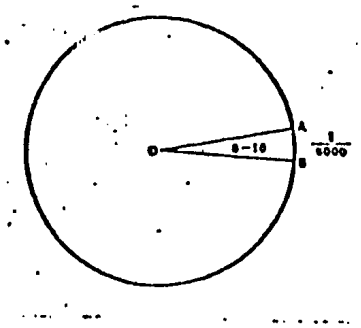


Diagram 11. A Mil

2. Methods of Writing and Reading Mil Values

(1) 密位数	(2) 写法	(3) 读法	
3	0-03	零·零三	(4)
15	0-15	零·一十五	(5)
340	3-40	三·四十	(6)
1000	10-00	一十·零	(7)

Key: 1. Mil number
2. Method of writing
3. Method of reading
4. Zero point zero three
5. Zero point one five
6. Three point four zero
7. Ten point zero

RANGE ESTIMATION

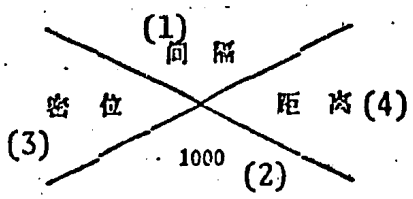
A correct reading of the elevation scale (in mil) is based mainly on a good range estimation. For this reason, constant practices are required to be familiar with and for the grasping of the basic techniques for range estimation.

I. Range Estimation by Mil Formula

First estimate the span (height and width) of the target and then use the view finder, mil ruler, finger width or other handy tools to appraise the corresponding mil number and then use this formula:

$$\text{Range} = \frac{\text{Space} \times 1000}{\text{Mil}}$$

The mil formula can be memorized by the following rhyme: span above, one thousand below, mil and range on both sides, to find the unknown, multiply the opposites and divide them by the sides.



Key: 1. Span
2. 1,000
3. Mil
4. Range

For example, if the telephone pole is 6 meters and the estimated mil reading is 0-10 what is the range of the telephone pole?

Explanation: Range = $\frac{6 \times 1000}{10}$ = 600 (meters)

The method of finding the corresponding mil number of the width of a finger or a handy tool: first measure the distance of the arm held from the eye and then measure the width of the finger or a handy tool in millimeters and use the measurements to obtain the corresponding mil numbers through the mil formula. The corresponding mil numbers will be close to twice the millimeters of the width of the finger and the handy tool with the arm held 500 millimeters from the eye. The corresponding mil numbers of the finger width of an ordinary person and a handy tool can be seen in Diagram 12.

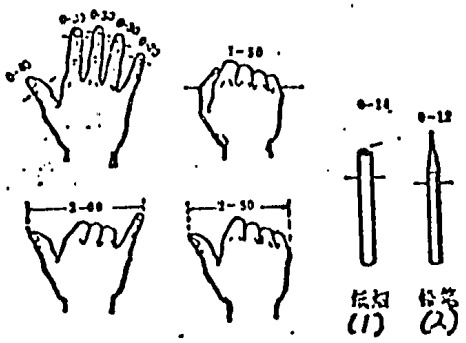


Diagram 12. Corresponding Mils of Finger Width and Handy Tools

Key: 1. Cigarette
2. Pencil

The method of using the finger width and a handy tool to estimate the mil number: Hold the arm out to 500 millimeters and compare the width covered by the fingers and that of the target and by comparison, find the mil number of the target, based on the already known corresponding mil numbers obtained from a finger width and a handy tool.

II. Range Estimation by Eye

A. Eye Leaping Method (Diagram 13)

Face the target, raise right arm forward to 60 centimeters, stick up the thumb, close the left eye, use the right eye to aline one side of the thumb with the target, keep the head and thumb still, close the right eye, use left eye to aline the same side of the thumb with the leaping point, estimate the width between the target and the leaped point and times the width with "10" to obtain the range.

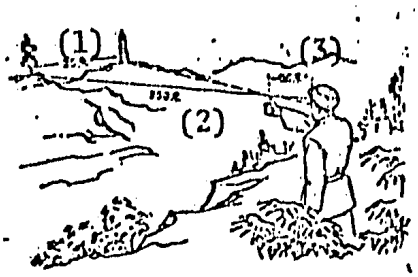


Diagram 13. Eye Leaping Method

Key: 1. 25 meters
2. 250 meters
3. 0.6 meters

B. Comparative Method (Diagram 14)

The distance of a target can be roughly estimated by comparing it with a person's sensed known distance or with his sensed familiar distance (such as his strong impression of the distance of 100 meters to a target).

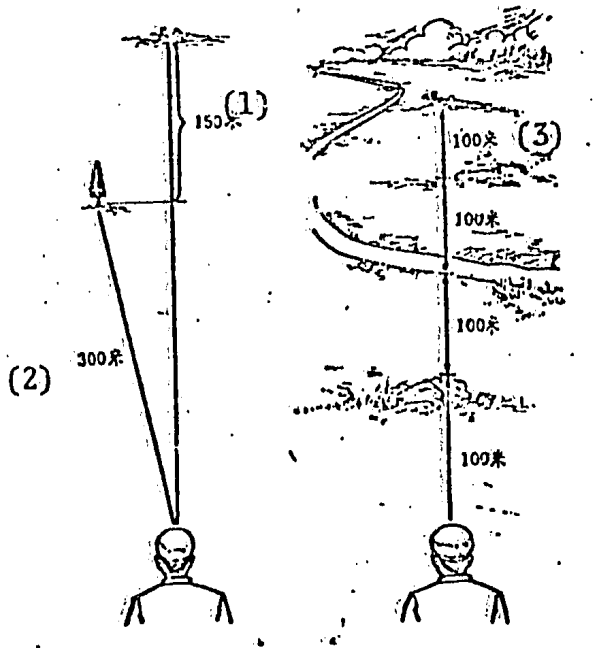


Diagram 14. Estimating Range by the Comparative Method

Key: 1. 150 meters
2. 300 meters
3. 100 meters

The range of the target can also be found by dividing it into several equal sections and multiplying them with a known or familiar unit of distance.

III. Sound and Light Method

The range can be determined by sound and light, based on the speed of sound (330 meters per second). This is the method: when the light of fire or burst is seen, start counting at a rate of three numbers for each second, 1, 2, 3, 4, 5...; stop counting when sound is heard; the last number would be equal to the number of hundred meters.

For example: When the count from sighting the light to hearing the sound is 5, the distance is 550 meters.

FIRE DRILL

Fire drills are the foundation to accurate fire of the 60 mortar and the key to good firing and training. For this reason, it is imperative that training be strict, demands be firm, practices be repeated, and fire drills be grasped and mastered.

I. The Duties of the Gunners [Note: every member of the squad is a gunner.) and Placing the Mortar in Action and Out of Action

A. The Duties of the Gunners

Leader (concurrently assumed by the squad leader or deputy squad leader) is responsible for the directing of fire; he carries the aiming post and the accessory bag.

Gunner No 1 is responsible for sighting; he carries the mortar and the sight.

Gunner No 2 is responsible for loading and firing the cartridge, for digging the baseplate hole and assisting gunner No 1 in his operation; he carries the small round shovel (hoe) and ammunition.

Gunner No 3 is responsible for preparing and passing the cartridge. He carries the ammunition.

Gunner No 4 is responsible for inspection, cleaning and preparing the cartridge; he coordinates the observation and carries the ammunition.

The squad is a combat unit. The squad members must work together and coordinate their actions. A member must not only be familiar with his assignment but that of the other gunners to meet the demand of fighting.

B. Placing the Mortar in Action and Out of Action

1. Placing the Mortar in Action

Command: "Place mortar in action toward xx"

Action: Gunner No 1, facing the direction of the target, grasps the upper part of the barrel, takes one step backward with his right foot, forming a 90 degree angle with his left foot; rotates the baseplate to the left to 90 degrees, places it between his legs; leans the upper part of the barrel on his right leg, unbuckles the barrel strap, pulls the bipod legs apart, faces them in the direction of the target, using both hands, he presses the feet into the ground, kneeling on right knee at the left-rear of the baseplate, he adjusts the bipod to horizontal position, tightens the lock nut of the hand grip [of the left leg], places the sight into the mortar slot, and sets elevation to "6-00" and deflection to "0". Gunner No 2 takes a stride forward to the right with his left foot and a step forward with his right foot and then kneeling on his left, right of the baseplate, he removes the muzzle cap, turns the elevation crank and helps gunner No 1 to center the bubbles of the longtitudinal level and cross-level vials. On completion, Gunner No 1 announces "hao" ("completed"). Gunner No 3 and Gunner No 4 staying behind of and to the right of the mortar position, spread out to prepare the ammunition according to the terrain. The gunners stand apart within a space convenient for passing the ammunition. The leader of the crew stands in the front to the left of the mortar for the convenience of giving order (Diagram 15).

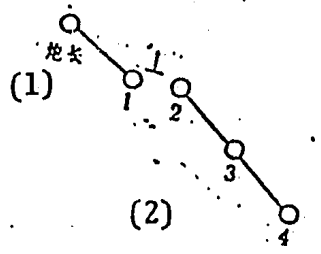


Diagram 15. Positions of the Gunners in Placing the Mortar in Action

Key: 1. Leader
2. Gunners

In moving forward and using the mortar intermittently, Gunner No 1 steps forward with his left foot, grasps the shock-absorbing handle with his left hand, holds the upper part of the protective sleeve of the elevation mechanism with his right hand and places the mortar between his legs. The rest of the movements are the same as halting intermittent fire.

2. Out of Action

Command: "Out of action"

Action: Gunner No 1 takes the sight out of its slot and puts it into the sight box. Gunner No 2 cranks the elevation to the lowest point, turns the traverse mechanism to the center, and caps the muzzle. Gunner No 1 grasps the leg of the bipod in the space between the thumb and the index finger of his left hand; lifts up the mortar with his right hand, the thumb and the index finger pointing downward with palm facing forward, by grasping the lifting handle of the lower part of the mortar barrel; pushes the barrel forward with his right hand so that the bipod and barrel join together; leans the upper part of the barrel on his right leg and buckles the strap; grasps the upper part of the barrel and, while standing up, moves the right foot to the left to assume a stance of "attention." Gunner No 2 after rising takes one right step backward, another left step backward to the left, brings the right foot to the left and resumes the "attention" position. Gunner No 3 and Gunner No 4 pack up the ammunition. The crew then moves according to the command of the leader.

C. Digging Hole for the Baseplate

Generally, it is not necessary to dig a hole for the mortar baseplate. Level ground will be adequate. But if the angle is too great or if firing is done from a slope, a hole in the ground is needed for the baseplate to increase firing accuracy. Method: draw a line squarely to the target and dig according to Diagram 16.

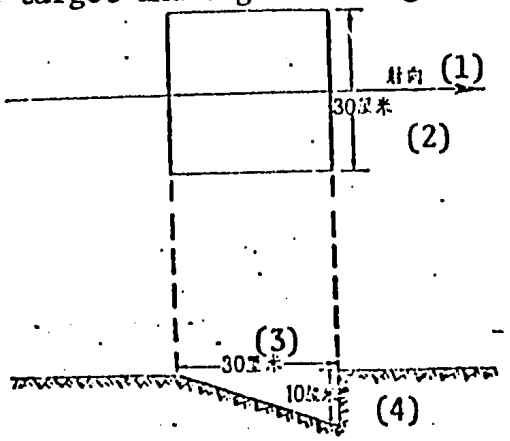


Diagram 16. Baseplate Hole

Key: 1. Firing direction
2. 30 centimeters
3. 30 centimeters
4. 10 centimeters

II. Aim and Stake

A. Aim

Command: "Elevation x x, deflection x x, aim toward x x."

Action: Gunner No 1 while repeating the order, sets the elevation and deflection scales, looks at the vertical reference line in the sight, steadies and, levels and moves the bipod with both hands so that the vertical reference line will roughly be in line with the target; he then presses both legs of the bipod into the ground, turns the traverse mechanism so that the vertical reference line will be precisely on target. While Gunner No 1 is in action, Gunner No 2 turns the elevation mechanism and the cross-level mechanism so that the bubbles of the longitudinal vial and the cross-level vial will be centered. After these steps are completed, Gunner No 1 reports back "hao" (completed). The leader must inspect the work.

B. Stake

After sighting, it is necessary to place stakes [in order to check] for accuracy in firing. Staking can be done to the left or right of the mortar position (within 1-00) and in front of the mortar. A significant object or a planted stake can be used as the staking point.

Command: "Set stake at x x "

Action: Without disturbing the barrel, Gunner No 1 uses his left hand to turn the deflectional knob so that the vertical reference line aligns with the staking point. After this is done, he reports back, "the staking scale reads x - x x ". The leader writes down the reading for correction in firing.

III. Giving Fire Direction

When the mortar is in a defilade or semi-defilade area it cannot be aimed directly at a target; the following methods to give direction to fire can be used:

A. Staking Method

The leader goes to a place where he can see the target and the mortar position. In line with the mortar and target, he first drives a stake [into the ground] at a far point, moves back, and drives a stake [into the ground] at a nearby point (the distance between the far and near stakes being approximately that of the near stake and the mortar position). Both stakes are in line of the

target and mortar position. He then issues a command for aligning both stakes. Gunner No 1 moves the deflectional scale to "zero" and with the cooperation of Gunner No 2 aligns both stakes so that they meet the vertical reference line in the sight. This gives a good firing direction. If they do not meet, look at the far stake first and then look at the near stake for orientation and then sight the far stake again. After gunner No 1 has completed the actions, he reports back "hao" (completed). The leader or the gunner assigned to do the job then pulls up the stakes.

B. Aim-at-a-point Method

Select a prominent object to the left or right (within 1-00) of the target as the aiming point. The leader standing within five meters of the mortar position first estimates the deflection mil number between the target and the aiming point, he then issues the command "deflection to the left (right) x -xx, aim at x x." Gunner No 1 repeats the order and sets the deflection scale and sights the aiming point; after sighting, his work of giving fire direction is completed.

C. Plumb Line Method

The leader standing at a suitable place behind the mortar position holds a plumb line toward the target and directs the gunners to move the bipod or to turn the deflectional mechanism, maintaining the bubbles of elevation and cross level in the center, so that the plumb line and the white strip on the barrel and the target are in line. The work of giving the direction for fire is thus completed.

IV. Loading Cartridge and Firing

A. Preparing the Ammunition

Before firing clean the cartridges of dirt and grease, particularly the ignition hole and the gas check bands and their grooves. Examine the cartridges and reject those with cracks or pittings. Separate the cartridges by weight, identification markings (or tags) and then fill each cartridge with propellant cartridge, attach propellant increments (Diagram 17) and then follow the normal procedures of putting on the fuze.

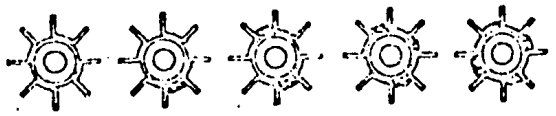


Diagram 17. Charge Numbers

Note: In place of No 1 increment two small bags of increments can be used by placing them diagonally; in place of No 3 increment use two large bags and two small bags of increments, placing them diagonally, large bag facing large bag, and small bag with small bag.

Key: 1. Propellant charge No 0
2. Propellant charge No 1
3. Propellant charge No 2
4. Propellant charge No 3
5. Propellant charge No 4

B. Loading the Cartridge for Firing

Command: "Propellant charge No x, x rounds, fire."

Action: While repeating the command "propellant charge No x, x rounds," Gunner No 3 prepares the cartridge and grasps the cartridge tail with his right hand palm up (so that an increment faces the palm), and, with the cartridge head upward and forward, hands the specified number of cartridges over to Gunner No 2. Gunner No 2 using his right hand grasps the cartridge around the second or third gas check band with palm down, the thumb and index finger forward, using the thumb, index and middle fingers; inserts the cartridge in the muzzle of the mortar (leaving two or three bands out) and aligning one bag of increment with the white line inscribed on the barrel; and then reports back "propellant charge No x is ready." When he hears the command "Fire", he immediately releases the cartridge and simultaneously withdraws his right hand downward from the muzzle. After firing the specified number of rounds, he reports back, "X rounds fired."

In inserting the cartridge, do not thrust, guide or push the cartridge but let it slide down smoothly. The number of gas check bands held out should be the same for every cartridge inserted. Inserting the fuze end into the muzzle is strictly forbidden.

In quick firing (the firing of two or more rounds continuously at each command) Gunner No 1 must watch the centering of the bubbles, and Gunner No 2 must watch for sparks and flame to avoid mishaps in the next loading.

FIRE COMMANDS AND FIRING METHODS

The important link to accurate firing of the 60 mm mortar are the correct estimation of conditions, timely judgement, precise fire commands, and a lively firing method. For this reason, it is imperative to train hard and to attain great skill in handling the mortar.

I. Selection and Occupation of Mortar Position

The 60 mm mortar usually occupies a defilade or semi-defilade position, but it can take an open position if necessary.

A. Selection of Position

The selection of a position is based on the principle "develop fire power from a concealed position." Therefore, strive to find a convenient place for observation, coordination and mobility, and stay away from isolated and prominent structures and rocky areas; when firing from a defilade position, the distance of the position to the defilade should be greater than the height of the defilade to enable the mortar to fire [at least] at a 45 degree angle.

B. Occupation of Position

Before assembling at the mortar position, the various gunners should utilize the terrain to disperse, take cover and make all sorts of combat preparations. After the leader finds the position he signals (or leaves clues to) the whole squad (group) to come quickly and steathily to the site; he then indicates the mortar position and gives the command "Aim the mortar toward x x." The gunners assume their duties by placing the mortar and preparing the ammunition.

II. Preparation of Data for Initial Fire

A. Preparation of Data

The preparation of data generally involves propellant charge, elevation, and deflection.

1. The propellant charge number is determined by the firing range. Ordinarily, charge No 0 is for a range within 300 meters, No 1 for 400-600 meters, No 2 for 600-800 meters, No 3 for 800-1,100 meters and No 4 for more than 1,100 meters.

2. Elevation (mil)

Based on the range and the propellant charge number, look up the column of elevation in the tale or that of another simplified table of comparable cartridge for the elevation (mil). If firing is under a head or tail wind and/or extremely cold weather, adjustments should be made. If the cartridge is too heavy or too light, adjustments should also be made. Add mils for heavy cartridge; deduct mils for light cartridge. Look for adjustment under the column of weight change/mil change in the table.

3. Deflection Scale

When the target can be seen directly from the mortar position use "0" deflection. When the target is not in direct alinement of sight, use posts (mil) for deflection reading. Adjustments should be made for cross wind.

B. Commands and Execution

The command of the leader must be clear, precise, brief and understandable and be given in proper sequence. The gunners should quickly and correctly execute his command.

1. Proper sequence of initial command: target, propellant charge, elevation, deflection, round, fire.

For example: Command for firing at an enemy machine gun position 500 meters away: "enemy machine gun position, propellant charge No 1, elevation 6-21, deflection 0, one round." After Gunner No 2 announces "Propellant charge No 1 is ready," the leader orders: "Fire."

2. Correction of command: For example, "add 0-20 to elevation, deflect 0-05 to the right, three quick rounds, fire!"

3. When an error in command or execution is found it should be corrected immediately. For example, if the elevation is wrong, first issue the command "halt" or "cancel elevation" and then give the correct command.

During firing if any change in propellant charge or angle of firing is needed all the leader has to do is to issue a new order on propellant charge or elevation.

III. Observing Point of Burst and Correction

Chairman Mao teaches us: "If a man wants to succeed in his work that is, to achieve the anticipated results, he must bring his ideas into correspondence with the laws of the objective external world." Errors in estimating the range, the effects of external conditions and wrong firing procedures can cause the firing to be off the target. To increase accuracy in firing one must be skillful in observing the point of burst and in applying the methods of correction.

A. Requirements

In observation one must be familiar with the terrain and prominent objects in the target area. At the instant of the burst of the shell he should immediately determine the point of burst

(the light of explosion, the center of the burst of smoke, and the shell pit) and calculate the deviations in meters for range and in mils for deflection of the burst point to the target. When wind prevails, do not determine an observation on the dispersed smoke of burst in order to avoid a wrong observation.

B. Deflection Observation and Correction

When the point of burst is observed, use finger width or handy tools to estimate the deflection (mil) of the burst point to the target. If deviation is to the left, make correction to the right; and vice versa for right deviation.

C. Range Observation and Correction

After the point of burst is observed estimate the deviation, by meters, of the burst point to the target. Smoke beyond the target is an over shot; smoke in front of the target is a short shot (Diagram 18). Increase mil for short shot; diminish mil for over shot. Correction is made by multiplying the deviated distance of 10 meter units by the elevation correction corresponding to 10 meters.

Diagram 18. Over Shot, Short Shot

Key: 1. Target
2. Short shot
3. Over shot
4. Target

Example: Firing at an enemy machine gun position with propellant charge No 1, elevation 5-34, one round, was short 30 meters, find the correction.

Looking under the column of elevation correction corresponding to 10 meters we find the correction to be 0-80.

Correction = 30 - 10 × 0-08 = 0-24

Elevation = 5-34 + 0-24 = 5-58

If there is oblique wind, it is easy to make a wrong estimation (Diagram 19) so pay close attention in observation.

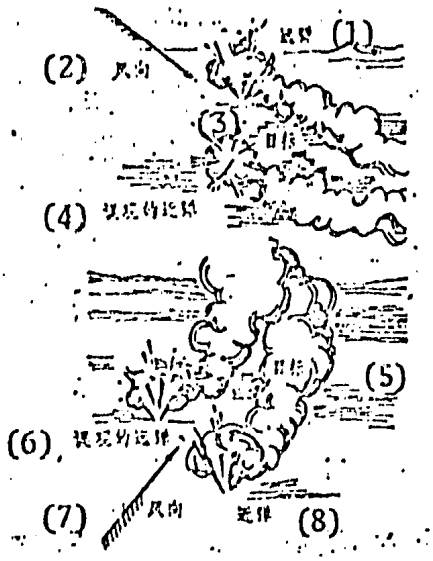


Diagram 19. Oblique Wind Causing Wrong Estimation

Key:
1. Over shot
2. Wind direction
3. Target
4. Wrongly observed as a short shot
5. Target
6. Wrongly observed as an over shot
7. Wind direction
8. Short shot

When the round is a dud, determine the deviation by the point where the dust is raised.

For the convenience of checking and correcting firing, when conditions permit make notes of the results of observation (See the brief symbol chart)

[Symbol chart is missing.]

Key:
1. Brief symbol chart
2. Observation result
3. Brief symbol note
4. Over shot
5. Over 20 meters
6. Short shot
7. Short 50 meters
8. Deflect left
9. Deflected left 20 mils
10. Deflect right
11. Deflected right 30 mils
12. On target
13. Out of sight

IV. Fire Methods

A. Firing at Fixed Targets

Using the prepared data, first fire one round for initial firing. If the first round hits the target, (see if any adjustment is needed), immediately fire two to four quick-fire rounds. If the deviation is not great, estimate the deviation from the point of burst to the target, and after making the necessary corrections directly [from the mortar] to the target, fire two to four quick-fire rounds; if the deviation is too great, fire another round, and after the key elements mentioned above have been corrected, immediately change to quick fire.

Keep watching the results of firing, make timely corrections and keep this up until firing is completed.

B. Firing at Moving Targets

A moving target continually changes direction, range and speed. For this reason, alert fire is needed to cope with its movements.

1. Select an anticipated point which is in the path of the enemy's movement, estimate the distance from that point, find the corresponding elevation (mil), lay the mortar according to the firing data, and, at the proper time, issue the command "Fire!"

When firing deviates from the target, corrections are needed not only for the lapse of time needed for the leader to revise the firing data, the gunners to operate their equipment, and the projectile to travel, but also for the change in range and direction of the target during that time. Therefore, besides correcting the deviations in firing, it is also necessary to make adjustments for the time needed for the leader to revise the firing data, the gunners to operate their equipment and the projectile to travel, and also the distance moved by the target during that time. Generally, in calculating the deviation, double the distance moved by the target within the time corresponding to the flight of the projectile.

a. Method of Correction for Firing at Longitudinal Moving Target

When the enemy moves toward us and our firing is beyond the target, add more (mils) to the deviated number; for firing short of the target, deduct from the deviated number. When the enemy retreats, do the opposite: for over shot, deduct mils; for short shot, increase mils.

Correction of range = (Distance moved by target in time corresponding to projectile flight x 2 ± the deviated distance) ÷ by 10 x corresponding conversion of 10 meters into elevation mils.

For example: The enemy infantry moves toward our position. Our squad leader selects an earth mound in the path of the enemy's advance and estimates its range as 700 meters from our mortar position. From the firing table, the elevation is 6-39 and the vertical movement of the target during the projectile flight is 57 meters. He then gives this order: "Moving infantry, propellant charge No 2, elevation 6-39, deflection "0", aim at the earth mound, fire three quick rounds."

When the enemy infantry reaches a point 57 meters from the mound, our leader gives the order "Fire!"

After three quick-fire rounds, the bursts drop short of 30 meters.

Correction - (57 meters x 2 minus 30 meters) ÷ 10 x 0-07 = 0-59

He then gives this order "Minus 0-59 from elevation, 4 quick-fire rounds. Fire." Based on the corrected data fire until the target is wiped out.

b. Method of Correction for Firing at an Horizontal Moving Target

When the round bursts in the front of the enemy, diminish the deviation (mil); if it bursts behind him, increased the deviation (mil).

Correction in direction = Deflection movement of the target during the projectile flight x 2 ± the deflection.

For example: Enemy infantry in the front and to the right of our position is moving to the left. Our leader selects an aiming point in the path of the enemy's movement, estimates the range as 600 meters, finds 7-28 in elevation and 0-71 in moving deflection from the table and immediately issues the order: "Moving infantry, propellant charge No 1, elevation 7-28, deflection '0,' aim toward

designated point, three quick-fire rounds."

When the enemy reaches the point 0-71 away from the designation of firing, our leader immediately issues the command "Fire!"

After three quick-fire rounds, the center of burst is 0-10 behind the enemy.

Correction = 0-71 x 2 $\pm$ 0-10 = 1-52

He immediately issues the order: "1-52 to the left, four quick-fire rounds, fire." Corrective firing by this method is continued until the target is wiped out.

c. Method of Correction for Firing at Oblique Moving Target

Correct both range and direction simultaneously. Under the column of oblique movement of range and direction in the table find the lead.

NIGHT FIRING AND SIMPLIFIED FIRING

I. Night Firing

"Close quarter combat and night combat are part of our glorious traditions. In the past we have used these techniques to annihilate our enemies." During night firing, because of limited visibility, firing procedures, ranging, directing and visual checking are rather difficult. For this reason, night firing exercises should be stressed, and night firing capabilities should be improved.

A. Firing Methods

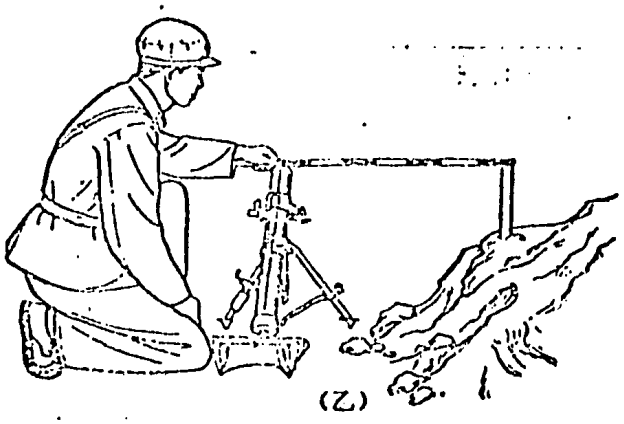
At night, illumination devices are usually employed when firing the 60 mm mortar; when illumination devices are not employed, the following firing methods are to be used.

1. Firing at Predetermined Targets (Diagram 20 a,b.)

Before nightfall, prepare the firing settings, lay the mortar for elevation and azimuth; before packing in the mortar, mark, with small wood stakes or other at-hand materials, the positions of the baseplate, the support foot plates and the marker light (stick the stakes in the ground at the four corners of the baseplate and the outside of the support foot plates), then crank the elevating crank to its lowest point and the traversing crank to its outermost point, memorizing the number of turns used for each adjustment.

When it is time to fire the mortar, position it according to the markers in the correct position, turn the elevating crank and the traversing crank back to their original positions, and then fire. Also, one may use the aiming post, string, sticks, or other at-hand materials to mark the position of the elevating mechanism and the traversing mechanism and the distance of the muzzle from the ground, and thus position the mortar for firing.

(甲) (a)



(乙) (b)

Diagram 20. Marking Firing Positions (a, b)

2. Firing at Targets of Opportunity

When firing at targets of opportunity, the primary method of calculating distance is the sound and flash method. Use the aiming stake or other handy stick to indicate the mortar-to-target line of fire, then use the plumb-bob to lay for azimuth; cause the centers of the support discs to be 50 centimeters from the backpack rings on the baseplate (the elevation will then correspond to approximately 9-00 on the scale; each turn of the elevating mechanism is approximately equivalent to 0-15; each turn of the traversing mechanism is approximately equivalent to 0-14). After this, lay the azimuth by turning the scale the number of turns equivalent to the target distance, and then fire.

B. Observation and Correction of Point of Burst

In observing the point of burst at night, one should use the flash of light at the moment of burst to observe the relationship of the point of burst and the target, and quickly measure the direction and distance of deviation from point of burst to the target.

Method of correction: when using illumination devices for firing, the correction method is the same as in daylight. When illumination devices are not utilized, the correction for deviation in distance can be made through the corresponding ratio of turns on the elevating crank; the correction for the deviation in azimuth can be made through the corresponding ratio of turns in the traversing mechanism.

C. Requirement for Nighttime Firing

1. Before firing one should prepare the illumination devices to be used and the marking stakes/materials to be used.

2. Night time firing requires strict organization and predetermination of the various signals (reminders). Operations should be done carefully; inspection should be thorough to avoid errors.

II. Simplified Firing

Simplified firing is a method of firing which our army has used during the revolution, a method which is often used for close fighting with the enemy. The operation is simple, firing is quick, it is not affected by terrain, and therefore it should be mastered.

A. The Method

In firing, the gunner faces the target, the left leg is extended forward a half pace, pointing toward the target; simultaneously, he kneels with the right knee to the right, with the right thigh forming a 90 degree angle with the azimuth, the buttocks coming to rest on the right heel, the left shin assuming an almost vertical position. With both hands he raises the mortar tube and thrusts the barrel base breech ball into the ground on the right side of the left foot at a comfortable position (when the baseplate is available, use the baseplate); the barrel should be about 10 centimeters from the left shin. According to the range, raise or lower the barrel to lay the mortar for range (use the type M-5 fuze, No. "0" propelling charge, azimuth 76.7 degrees, range 200 meters). The left hand grasps the barrel in the vicinity of the band, the

left forearm is braced against the inside of the left thigh. The right hand positions the mortar shell in the muzzle; close the left eye, and with the right eye, sight, lining the white aligning line on the barrel and the center of the fuze with the target, at the moment the aim is taken, hold your breath, and quickly release the mortar shell (Diagram 21). After firing, quickly position the second round in the muzzle, and take note of the point of burst. When corrections are needed, move the body of the barrel to the left or right to correct for azimuth, raise or lower the barrel to correct for range. After correcting, continue firing.

Diagram 21. Simplified Firing

B. Requirements

When firing, the upper body should be held steady, never allow the head to approach the muzzle, the left hand should not move. According to conditions, be prepared to quickly change your firing position.

APPENDIX

I. Firing the 60 mm Mortar With Live Ammunition

一、六〇迫击炮实弹射击条件

(1) 区分	(3) 目的	(5) 目标	(7) 射击距离（米）	(9) 装向予方射法	(11) 使弹用数	(13) 时间	(15) 成绩评定	(17) 实施方法
第一次（直接瞄准）射击(2)	检验炮长、炮手（3）、半径15米，射击的指挥、操作技能。	地环中央设目标。	300—400		5发	不限	优秀：命中3发以上，良好：命中2发及格：命中1发	炮组在发射阵地附近，接炮长口令占领已构筑好的发射阵地，向目标实施直接瞄准射击，依次换手操作，每人发射1发。
	(4)	(6)	(8)	(10)	(12)	(14)	(16)	(18)

Key:
1. Categories
2. First firing: direct sighting
3. Objective
4. Testing the command and operations capabilities of the gunner and assistant gunner under conditions of direct sighting
5. Target
6. Circular ground target, 15 meter radius, with target set up in center
7. Range (meter)
8. 300-400
9. Laying methods
10. [no entry]
11. Rounds fired
12. 5 rounds
13. Time limit
14. Unlimited
15. Grading criteria
16. Exceptional: 3 or more rounds on target; Expert: two rounds on target; Passing: one round on target
17. Methodology
18. The mortar squad, being in the vicinity of the firing emplacement, upon the command of the gunner, occupies the already prepared firing emplacement, fires on the target using the direct sighting method; squad members change positions after each round, each man firing one round.

(1) 区分	(2) 目的	(3) 目标	(4) 射击距离（米）	(5) 试向予方射法	(6) 使弹用数	(7) 时间	(8) 成绩评定	(9) 实施方法
(10) 第二次（间接瞄准）射击	(11) 检验炮长、炮手间接瞄准射击的指挥、操作技能。	(12) 同上	(13) 600—800	(14) 双标杆法	(15) 6发	(16) 6分钟	(17) 同上	(18) 炮组在发射阵地后30米处受领任务，接炮长口令占领发射阵地，向指定目标实施间接瞄准射击。
(19) 第三次（夜间）射击	(20) 检验炮长、炮手在夜暗条件下射击的指挥、操作技能。	(21) 地环记，半径15米，中央设2.5伏灯珠显示目标。	(22) 200—300	(23) 自选	(24) 6发	(25) 6分钟	(26) 优等：命中3发以上良好，命中2发及格，命中1发	(27) 炮组在发射阵地附近受领任务，接炮长口令（信号）后装、填的进入阵地，向指定的灯光（闪光）目标实施射击。
(28) 注	(29) 时间计算：自下达进入阵地口令起，到最后一发发射完毕不超过6分钟。							

Key:

1. Categories
2. Objective
3. Target
4. Range (meter)
5. Laying method
6. Rounds Fired
7. Time Limit
8. Grading Criteria
9. Methodology
10. Second firing: indirect sighting
11. To test ordering and operating capabilities of the squad leader and the assistant gunners under conditions of indirect sighting
12. Same as above
13. 600-800
14. Double sighting-stakes method
15. 6 rounds
16. 6 minutes
17. Same as above
18. The mortar squad receives its instructions at a point 30 meters behind the firing position. Upon the command of the squad leaders, they occupy the firing position and lay the mortar on the appropriate target by the indirect sighting method.
19. Third firing: night firing
20. To test the ordering and operating capabilities of the squad leader and assistant gunners under nighttime conditions.
21. Circular ground target, 15 meter radius, in the center of the target is positioned a 2.5 watt target light

22. 200-300
23. Optional
24. 6 rounds
25. 6 minutes
26. Exceptional: three or more rounds on target; Expert: two rounds on target; Passing: one round on target
27. The mortar squad receives its instructions in the vicinity of the firing position; upon the order (signal) of the squad leader, they move under cover and in silence to the firing position, lay the mortar on the appropriate light (flash) and fire.
28. Note
29. Calculating time: no more than six minutes should elapse between the giving of the verbal command to occupy the firing positions and the firing of the last round.

II. Regulations Governing Firing of Live Ammunition and Safety Procedures

When firing live ammunition, if the center of the impact of the live round is within 15 meters of the center of the target, it is considered a hit.

Before firing, the ammunition must be inspected rigorously, and if any cracks or pitting is found on the casings, those rounds must not be used.

All other procedures are identical with those for the 40 mm rocket launchers as contained in "Regulations and Safety Procedures for Live Ammunition Firing."

III. Specifications of the 60 mm Mortar and Ammunition

[See next page.]

(1)	口径	60毫米
(2)	炮身长	618毫米
(3)	全重 (不带瞄准镜)	12.5公斤
(4)	炮身重	4.5公斤
(5)	炮架重	4.6公斤
(6)	座钣重	3.4公斤
(7)	炮弹重	1.36公斤
(8)	瞄准镜重	0.3公斤
(9)	最大射角	85°
(10)	最小射角	45°
(11)	最大初速	134(140)米/秒
(12)	最小初速	65(70)米/秒

Key:
1. Calibre: 60 mm
2. Length of Barrel: 618 mm
3. Weight (without optical sight) 12.5 kgs
4. Barrel weight: 4.5 kgs
5. Bipod weight: 4.6 kgs
6. Baseplate weight: 3.4 kgs
7. Mortar shell weight: 1.36 kgs
8. Optical sight weight: 0.3 kgs
9. Maximum elevation: 85 degrees
10. Minimum elevation: 45 degrees
11. Maximum muzzle velocity: 134 (140) m/s
12. Minimum muzzle velocity: 65 (70) m/s

IV. Inspection and Calibration of the Optical Sight

1. The Inspection and Calibration of the Quadrant and the Zero Setting Cross leveling: after firing, position the air bubble in the center of the cross-level.

Laying the elevation: set the quadrant to read 45 degrees, and with the arrow pointing up, place it on the white alignment line on the band on the barrel of the mortar; rotate the elevating crank until the quadrant level bubble is centered; turn the elevation scale knob to center the bubble in the longitudinal level, note the scale reading.

Bore inspection: place the quadrant (arrow pointing upwards) across the mouth of the muzzle, and if the bubble in the quadrant is centered, then the quadrant is accurate and the mortar is laid in at 45 degrees. If the bubble in the quadrant is not centered,

this means that the quadrant is not accurate and the mortar is not laid in at 45 degrees. Now rotate the elevating mechanism to center the bubble in the quadrant and turn the elevation scale knob to center the bubble in the longitudinal level, and note this second scale reading. Then take the average of these two readings and set the optical sight at this setting. Turn the elevating mechanism to center the longitudinal level bubble, and the mortar is now laid in at 45 degree elevation.

Calibrating the quadrant setting: place the quadrant in its original position on the mortar tube or across the mouth of the mortar, loosen the set screws and move the base of the level until the bubble is centered and then retighten the set screw. Take the quadrant in hand, and using the screwdriver, loosen the three screws on the scale ring, move the dial until the 45 degree mark is accurately aligned with the index and then tighten the screws. After calibration, check the settings again according to the above methods until accuracy is achieved.

Calibrating the elevation scale: if the quadrant is accurate, calibrate after elevation laying is completed; if the quadrant is inaccurate, calibrate after the bore inspection is completed. The elevation scale mark of 10-00 should be aligned with the index, if it is not, make a calibration. During calibration, care should be taken not to move the elevation level bubble. Loosen the three screws on the elevation scale knob, turn the elevation scale ring until the setting 10-00 is aligned with the index, then tighten the screws. After calibration, recheck it according to the above methods.

2. Inspection and Calibration of the Zero Line

Having attained an accurate zero position, choose an aim point some 300 meters distant, and align the mortar with the aim point. Erect a vertical line about 3-5 meters behind the mortar, direct the gunner to move the mortar bipod or the traversing mechanism (while keeping the cross level bubble centered), and align the vertical line, the white alignment line on the mortar and the aim point accurately; thereafter, turn the deflection scale knob until the cross hairs in the sight are aligned with the target. At this time, the azimuth should read "0". If it does not read "0", loosen the screws on the deflection knob, pull the knob outward while maintaining the aim, turn the deflection scale ring to align the "0" with the index, tighten the screws. After calibration, recheck according to the above methods.

During inspection and calibration, one should be sure to keep the bubbles centered in the cross and longitudinal levels.

V. Firing Table and Table of Various Corrections (Part 1)

五、射表和各种修正量算成表

(1)(2)(3)(4)(5) (8) (9) (10)

装药号	距离 米	表尺 密位	相应10米的表尺 密位	(6)风(7) 横10米风 速秒 密位	纵10米风 速秒 密位	气温修正量 0 / +20°	−10° / +25°	−20° / +30°	−30° / +35°	−40° / +40°	弹个表尺的变换一位 密位	相应射弹飞行时间内目标的移动量(步兵3米/秒) 方向 纵向 密位	方向 斜向 密位	距离 纵向 米	距离 斜向 米
												(11)	(14)	(16)	(15)
														(13)	(12)
0	150	415	11	56	11	2/1	3/1	4/2	6/3	7/3	3				
	200	472	12	43	13						5				
	250	533	13	35	15						6				
	300	598	14	29	17						8	123	88	39	28
	350	674	17	25	23						12	98	68	36	25
	400	774	24	19	34						20	86	59	36	25
	300	458	7	49	13						4	161	114	51	36
	350	495	8	41	14						5	135	98	51	36
--	400	534	8	36	15	4/1	6/2	8/4	11/5	14/6	6	121	86	51	36
	450	575	9	32	17						8	101	72	48	34
	500	621	10	29	19						9	91	65	48	34
	550	671	11	26	23						11	83	59	48	34
	600	728	13	23	29						14	71	51	45	32
	650	793	18	20	41						21	66	47	45	32
	700	907	31	18	71						40	57	41	42	30
--	550	541	6	41	17	5/2	9/3	12/5	16/7	19/9	6	104	73	60	42
	600	572	6	37	18						7	90	63	57	40
	650	604	7	34	21						8	83	58	57	40
	700	639	7	31	22						9	77	54	57	40
	750	674	8	28	25						11	72	51	57	40
	800	719	10	26	30						13	64	45	54	38
	850	769	11	24	37						7	60	42	54	38
	900	830	15	21	50						22	54	38	51	36
	950	918	25	19	83						43	48	34	48	34

V. Firing Table and Table of Various Corrections (Part 2)

装药号 (1)	距离 (2)	表尺 (3)	相应10米距离的表尺变换 (4)	横风10米/秒 (6)	纵风10米/秒 (7)	气温修正量 (8) 0./+20°	-10°/+25°	-20°/+30°	-30°/+35°	-40°/+40°	每个弹重符号相应的表尺变换 (9)	相应射弹飞行时间内目标的移动量 (步兵3米/秒) (10) 方向 (11) 横向 (12)	方向 斜向 (13)	距离 (14) 纵向 (15)	距离 斜向 (16)
	米	密位	密位	密位	密位	密位					密位	密位	密位	米	米
三	750	566	5	43	22						6	84	60	65	47
	800	592	5	40	23						6	78	56	66	47
	850	618	5	38	25						7	74	53	66	47
	900	646	6	35	27						8	67	49	63	46
	950	676	6	33	29	7/2	11/4	15/7	20/9	24/11	9	63	46	63	46
	1000	708	7	30	32						10	60	44	63	46
	1050	744	8	28	36						12	54	38	60	42
	1100	7[illegible]4	9	27	42						15	53	36	30	42
	1150	832	11	25	54						20	47	33	57	40
	950	587	4	43	24						6	72	51	72	51
四	1000	609	5	41	25						6	68	48	72	51
	1050	632	5	39	27						7	65	46	72	51
	1100	656	5	37	28						7	62	44	72	51
	1150	681	5	35	31						8	57	40	69	49
	1200	708	6	33	34	8/3	13/5	18/8	23/10	28/13	10	55	34	69	49
	1250	738	6	31	37						11	52	37	59	49
	1300	770	7	29	41						12	48	34	66	47
	1350	807	8	27	48						15	46	33	66	47
	1400	848	10	26	58						19	43	31	63	46
	1450	902	16	24	96						33	39	28	60	42

说明 (17)

1. 本射表是以杀伤榴弹配用甲-5式引信进行实弹试验编拟的。因此，在配用100-3式引信射击时，应注意检验，予以适当修正。
2. 气温修正量是按+15°C计算的。
3. 相应射弹飞行时间内目标的移动量，是以步兵中等运动速度计算的。若目标速度快或慢，则应将移动量适当增加或减小。

Key:
1. Propelling charges: Number
2. Distance: meters
3. Elevation scale: mils
4. Elevation correction corresponding to 10 meters: mils
5. Wind
6. Crosswind speed 10 m/s: mils
7. Longitudinal wind speed 10 m/s: mils
8. Ambient temperature correction: mils
9. Change in elevation corresponding to each incremental change in ammunition weight: mils

[redacted] FPD 0030-75-4 PEOPLE'S REPUBLIC OF CHINA

CONF 31 JULY 75 02 of 02

10. Movement of the target for each moment of rocket flight (foot soldier speed of 3 m/s)

11. Direction
12. Lateral movement: mils
13. Oblique movement: mils
14. Range
15. Lateral movement: meters
16. Oblique movement: meters
17. Notes: 1) These tables are calculated for live ammunition testing with the anti-personnel mortar shell employing the M-5 fuze. When using the 100-3 fuze, inspection and examination [of results] should be made, and appropriate corrections made.

2) Ambient temperature correction is calculated at +15°C.

3) The movement of the target in the relative projectile flight time column is calculated for foot soldiers moving at medium speed; if the target is moving faster or slower, the movement factor should be increased or diminished the appropriate amount.

VI. Firing Chart for the Rare-Earth Cast Iron Anti-Personnel Cartridge Mated with the P'ai-One Chia ["mortar-1-A"] Fuze

六、稀土铸铁杀伤弹配用
迫-1甲式引信射表

(1)	(2)	(3)	(4)	(5)	(6) (7)	(6) (8)	(9) (10)	(9) (11)	(12)
号	米	密位	米	密位	米	米	米	米	米
	140	421	8	-1.1					
	160	447	8	-1.3					
	180	473	7	-1.6					
	200	501	7	-1.8					
	220	529	7	-2.1					
	240	558	7	-2.4					
0	260	589	6	-2.7			6	7	2 %
	280	622	6	-3.[illegible]					
	300	657	6	-3.7					
	320	696	5	-4.3					
	340	739	4	-5.2					
	360	790	4	-6.6					
	380	855	3	-9.4					
	400	1000	—	—	3.0	0.9			
一	264	417	15	—	2.9	1.5	14	18	1 %
	300	441	15	-2.3	3.2	1.5			
	350	476	14	-2.8	3.8	1.6			
	400	512	14	-3.3	4.4	1.7			
	450	550	13	-4.0	5.0	1.8			
	500	590	12	-4.8	5.6	1.9			
一	550	634	11	-5.7	6.0	2.0	14	18	1 %
	600	682	10	-7.0	6.[illegible]	2.2			
	650	737	9	-8.8	6.0	2.4			
	700	804	7	-11.9	5.6	2.6			
	750	904	4	-20.6	5.8	2.3			
	770	1000	—	—	6.8	1.7			
	450	450	21	-3.4	5.1	2.5			
	500	474	21	-3.8	5.6	2.6			
	550	499	20	-4.4	6.1	2.8			
	600	525	19	-5.0	6.6	3.0			
二	650	552	13	-5.6	7.2	3.2	24	31	1 %
	700	580	18	-6.4	7.7	3.4			
	750	609	17	-7.2	8.1	3.6			
	800	641	16	-8.2	8.6	3.8			
	850	674	15	-9.4	8.8	4.1			

Key:
1. Propelling charge: Number
2. Range: meters
3. Elevation scale: mils
4. Change in range for each 10 mil change in elevation and azimuth: meters
5. Correction for the elevation scale for each additional 1000 meters in altitude: mils
6. Probable deviation
7. In range: meters
8. In azimuth: meters
9. Wind
10. Crosswind speed 10 m/s: meters
11. Longitudinal windspeed 10 m/s: meters
12. Projectile weight for each additional increment: meters

VI. Firing Chart for the Rare-Earth Cast Iron Anti-Personnel Cartridge Mated with the P'ai-One Chia ["mortar-1-A'] Fuze

(1)	(2)	(3)	(4)	(5)	(6) (7)	(6) (8)	(9) (11)	(9) (10)	(12)
	900	711	13	-10.0	8.7	4.5			
	950	752	12	-13.0	8.4	4.8			
	1000	800	10	-15.9	8.0	5.1			
	1050	860	7	-21.8	8.0	4.9	21	31	1%
	1100	963	3	-34.8	9.3	3.3			
	800	541	24	-6.9	9.0	4.2			
	850	562	23	-7.6	9.5	4.4			
	900	584	22	-8.4	10	4.6			
	950	608	21	-9.2	11	4.9			
	1000	632	20	-10.2	11	5.2			
	1050	658	19	-11.3	11	5.5			
三	1100	686	18	-12.6	11	6.0	35	43	1%
	1150	715	16	-14.2	11	6.4			
	1200	747	15	-16.2	11	6.8			
	1250	784	13	-18.9	10	7.2			
	1300	826	11	-22.6	10	7.2			
	1350	878	8	-29.1	10	6.6			
	1400	963	4	-46.8	12	4.3			
	1410	1000	--	—	13	3.1			

Key:
1. Propelling charge: Number
2. Range: meters
3. Elevation scale: mils
4. Change in range for each 10 mil change in elevation and azimuth: meters
5. Correction for the elevation scale for each additional 1000 meters in altitude: mils
6. Probable deviation
7. In range: meters
8. In azimuth: meters
9. Wind
10. Cross wind speed 10 m/s: meters
11. Longitudinal windspeed 10 m/s: meters
12. Projectile weight for each additional increment: meters

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VII. Simplified Firing Table for the Pu-lang-te Type Fuze

(1) 装药号数	(2) 距离(米)	(3) 表尺(密位)	(4) 每增减10米相应密位	(5) 装药号数	(6) 距离(米)	(7) 表尺(密位)	(8) 每增减10米相应密位
〇	200	5-08	0-16	二	550	5-84	0-10
	220	5-40			550	6-00	
	240	5-72			600	6-45	
	260	6-07			650	6-88	
	280	6-48			700	7-41	
	300	6-90		三	750	6-46	0-07
一	330	5-36	0-13		800	6-80	
	350	5-57			850	7-16	
	370	5-76			900	7-60	
	400	6-09			950	8-17	
	430	6-49			1000	7-06	
	450	6-76		四	1050	7-52	
	470	7-06			1100	7-87	
	490	7-40			1150	8-40	
	500	7-52			1200	9-23	
(9) 说明	本表是按杀伤榴弹配用布郎德式引信计算的，射击时仅供参考						

Key:
1. Propelling Charge: number
2. Range: meters
3. Elevation scale: mils
4. Mils corresponding to each 10 meter increase or decrease
5. Propelling charge: number
6. Range: meters
7. Elevation scale: mils
8. Mils corresponding to each 10 meter increase or decrease
9. Note: This table is calculated for the anti-personnel cartridge carrying the Pu-lang-te type fuze, and should only be used when firing such cartridges.

VIII. Simplified Firing Table for the Type 100 Fuze

装药号数 (1)	射击距离 (2) (米)	表尺(密位) (3)	每增减10米 (4) 相应密位
〇	100	3-74	0-15
	150	4-37	
	200	5-12	
	250	5-90	
	300	6-85	
一	350	5-34	0-11
	400	5-82	
	450	6-33	
	500	6-98	
二	550	5-84	0-09
	600	6-23	
	650	6-70	
	700	7-20	
三	750	6-39	
	800	6-61	
	850	7-00	
	900	7-37	
	950	7-96	
	1000	8-55	
四	1050	7-14	0-07
	1100	7-46	
	1200	8-28	
(5) 说明	本表是按杀伤榴弹配用100式引信计算的，射击时仅供参考。		

Key: 1. Propelling charge: number
2. Firing range: meters
3. Elevation scale: meters
4. Mils corresponding to each 10 meter increase or decrease
5. Note: This table is calculated for the anti-personnel cartridge carrying the type 100 fuze, and should be used only when firing such cartridges.